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THE CARE OF THE CONSUMPTIVE

A CONSIDERATION OF THE SCIENTIFIC USE OF NATURAL THERAPEUTIC AGENCIES IN THE PREVENTION AND CURE OF CONSUMPTION; TOGETHER WITH A CHAPTER ON COLORADO AS A RESORT FOR INVALIDS

BY

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TO

DR. E. L. TRUDEAU

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THE PIONEER IN THE TREATMENT OF CONSUMPTION BY SANATORIUM METHODS IN AMERICA, WHOSE DEVOTION, SCIENTIFIC ABILITY AND NOBLE CHARACTER HAVE DONE SO MUCH TO SAVE THE CONSUMPTIVE'S LIFE, THIS LITTLE BOOK IS DEDICATED BY THE AUTHOR

THE purpose of this little book is to give, in as clear and practical a way as possible, the rules that should govern the consumptive in the use of fresh air, sunlight, food, rest, and exercise, so that these natural therapeutic agencies can be applied to the best advantage. As these are to-day, and have been from the dawn of medical history, the most efficient in action and durable in effect of any curative methods ever applied for the arrest of consumption, or tubercular disease of the lungs, it is hoped that a few practical hints as to their application, compiled from various sources by one who has had ample opportunities of testing their power, may be useful to the invalid or to his physician. But in making them the author does not intend in any way to supplant medical advice. In fact, he considers that the consumptive who is without the careful and constant supervision of a physician is like a ship adrift on the wide ocean without captain, sails, or rudder.

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THE CARE OF THE CONSUMPTIVE

CHAPTER I

THE NATURE OF THE DISEASE

THE term consumption is used in a general sense to indicate that form of tuberculosis that attacks the lungs. Tuberculosis can, and often does, develop in other parts of the body, as for instance in the glands of the neck, in the spine, hip, or intestines.

Definition

The average pulmonary invalid should know certain facts about his disease simply as a matter of education and to enable him to grasp intelligently the efforts which are made in his behalf. He should be told that consumption is a disease that is caused by minute germs that grow and multiply in the lungs, producing inflammation; that these germs are so

Germs

small that it is said that one thousand of them could march abreast through a hole in a card made by a cambric needle and yet not touch each other or the sides of the opening. They probably belong to the vegetable kingdom and, like many seeds, are quite incapable of motion. They cannot leave a moist surface, and they float in the air only when dried or carried by very small drops of fluid. These germs exist in great numbers in the expectorated matter coughed up by the tubercular invalid, and if this expectorated matter dries on a handkerchief, or on the floor or ground, it becomes dangerous, as it can be inhaled into the lungs mingled with dust, and any one who accidentally inhales that dust may be thus infected with consumption. The person who expectorated the germs may also be reinfected; and in this manner parts of the lungs which were sound before may become diseased. When the germs enter the lungs and find a condition favorable for their growth, they multiply and irritate the lung structure. Certain cells of the tissues together with the blood endeavor to arrest the growth of the germs and to shut them in; but often this is not successful, and, during the battle between the blood cells and the germs, the blood-vessels which

supply the diseased part of the lung become occluded, or cut off; the lung tissue then dies from lack of blood, and the result is that that part of the lung is lost.

Besides the tubercular germs, other germs, such as those of putrefaction, grow in the diseased part of the lung and generate certain poisons, as also do the germs of consumption; these poisons are drawn into the blood of the body and give rise to fever, chills, etc. Such a condition is called mixed infection.[1] Of course all this often may proceed very slowly, and the disease is arrested before any destruction of lung tissue takes place, and before the body has become poisoned at all seriously, and even in cases where destruction of part of the lung has occurred, healing leaving a scar is frequently seen.

Number of Consumptives

It is a comfort for us to remember that probably very many people have consumption and that the disease is arrested before there are any symptoms marked enough to notice. As a matter of fact, this occurs so often that it has been stated that from fifty to sixty per cent. of civilized people probably are tubercular

[1] Professor Pfeiffer, International Tubercular Congress, Berlin, May, 1899.

or have been so at some time in their lives, although not discovered to be so. Consumption is found in all parts of the world, being especially a disease due to overcrowding and bad air. It causes more deaths between twenty and thirty years of age than any other disease.[1] It has, however, been less frequent during the last few years, the number of cases in 1838 being one third greater than at the present time.[2] Cattle have this disease, especially dairy cows, and people can contract consumption from drinking milk taken from cows so infected. It is, therefore, better to boil the milk, unless it comes from a dairy where the cows are tested frequently for tuberculosis.

Cattle

Although consumption is not inherited—that is, the germs do not pass from the mother to the child before birth,[3] at the same time if a family has had several cases of consumption among its members, the rest of that family are more apt to contract the disease. People who do not have enough fresh air, or who

Heredity

[1] Dr. Kohler, *Boston Med. and Surg. Jour.*, June, 1899, p. 559.

[2] Ransome, *Researches on Tuberculosis*, p. 2.

[3] Virchow, International Tubercular Congress, Berlin, 1899.

live in crowded places where there is not enough sunlight, or who are poorly fed and do not have sufficient exercise properly to fill the lungs, are apt to have consumption.

Consumption is a curable disease, if taken in time and before much lung tissue is destroyed. The first symptoms may be only loss of appetite and of flesh, fatigue, pain at the back of the head, rapid pulse, fever in the afternoon, and a cough the first thing in the morning.

Curable

The best results in treatment by fresh air, good food, etc., seem to be obtained in the sanitaria,[1] in Europe and in this country. Nor is it to be wondered at, when we consider the painful attention to detail, and the strict enforcement of rules, insisted upon at these

Sanitarium Treatment

[1] Dr. E. L. Trudeau, in the *Practitioner* for February, 1899, says: "The principal aim of the modern sanitarium treatment of tuberculosis is to improve the patient's nutrition, and to increase his resistance to the disease, by placing him under the most favorable environment obtainable. The main elements of such an environment are invigorating climate, an open-air life, rest coupled with a careful regulation of his daily habits, and an abundant supply of nutritious food, with the exhibition of such restoratives and tonic measures as may be indicated in each case."

institutions, and also the advantage of having at their head men who are not only especially trained for such work, but, in many instances, men who devote their entire lives to the study and cure of tuberculosis. At the same time, some of the success of the sanitarium treatment must, of course, be due to the careful selection of only curable cases, those whose disease has progressed beyond a certain point being refused treatment; hence the selected cases which are treated are more apt to recover under such conditions.

Care

The main law, however, holds good in curing consumption: success follows more often by the use of rule and method and by a careful attention to details, than the reverse, much as business is successful if properly conducted. For this reason, probably, the best place to be cured of consumption is a properly conducted sanitarium in a suitable climate, where a special study of each case, and rules applied in a systematic manner, contribute largely to success. Unfortunately, however, this is a treatment which for several reasons is now within the reach of very few people compared with the number of consumptives who need it; and it is to those

who, for one cause or another, have to be treated in their own homes, or otherwise outside of a sanitarium, or who are living in boarding-houses or hotels at some health resort, that the following suggestions in this book are offered.

CHAPTER II

INFECTION

CONSUMPTION, it is true, is a disease that can be carried from one person to another, but under ordinary conditions such infection will not occur. The main point to remember is that the little germs are in the expectoration, and that, when dried so as to be readily carried by the air, they are dangerous, and hence that the expectoration should always be kept moist. One of the worst possible habits is to expectorate on a handkerchief, and then wave it about after the sputa has dried, as is done when it is again used. Nor should the expectoration be allowed to dry on the fingers, as it may be transferred to the atmosphere, or to other hands in shaking them. Hard coughing will also, it is claimed,[1] distribute small droplets capable of infection. One who is suffering from consumption even in a very slight degree should there-

Agents

[1] Irwin H. Hance, M.D., *Medical Record*, December 28, 1895.

fore be very considerate of others at least.[1] If possible, he should never expectorate anywhere except in a sanitary cup made of tin and paper, or into a vessel half filled with water, or, better, with a five per cent. carbolic acid solution (one tablespoonful of carbolic acid to a pint of water), or a tablet of bichloride of mercury or one of tartaric acid sublimate dissolved in half a pint of water, or a one per cent. chloride of lime solution. Cheesecloth or paper napkins can be carried for emergencies, as in public places where proper vessels are not at hand; such cloths should be tightly folded after using and then placed in a rubber pouch (an old tobacco pouch will do nicely) and not used again, but promptly burned when opportunity offers. The subject is not a pleasant one, and very often invalids are sensitive in regard to the dangers of their expectoration. Yet one can often see all rules disregarded in some cities and health resorts, and patients will expectorate everywhere —on walks, in public buildings, on the grass where children are playing, etc. The sun may, in a short time, kill the germs so exposed in the

Proper Measures

Disinfection

Precautions

[1] Flügge, *Deutsche Med. Woch.*, October 14, 1899.

sputa, but frequently, as I have proved, even in the strong sun-rays of Colorado, the germs live a long time if the mass of sputa is large and opaque.[1] The beard and moustaches should be clipped, so as to avoid infection by the sputa drying upon them and being conveyed to other people.[2]

Danger

It must be confessed that much unnecessary alarm has been created by lurid newspaper articles concerning the danger of infection, and people have been made very unhappy by them. It is well to know that with any reasonable precautions, such as I have mentioned, people can live with the consumptive and not fear infection, even if predisposed to it by inheritance. "The prevailing creed, which suspects external contagion as the cause of all scrofulous and tubercular attacks, is probably a much too narrow one."[3] Sleeping in the same room or bed is to be avoided if possible, also kissing on the mouth, using the same spoon, cup or glass, pipe, etc. Probably few persons ever do contract consump-

[1] Gardiner, *Amer. Jour. of the Med. Sciences*, 1892 and 1897.

[2] Dr. Schoull of Tunis (Sanitarium).

[3] Hutchinson in Allbutt's *System of Medicine*, vol. i., p. 43.

tion in the ways mentioned, and when they do they are predisposed to it from a lowered vitality, but it must be remembered that after infection the seeds may lie dormant, possibly for years; hence any risk should be avoided, at least in the present state of our knowledge concerning contagion or infection from dried sputa.[1]

[1] The author has deemed it best to state the commonly accepted theories in regard to contagion, such as the part played by the germ of tuberculosis which, is held to be the only cause of the disease—that is, that when such germs are inhaled into the lungs and grow there we have consumption.

Personally I think that contagion has been made too much of as a factor in causing tuberculosis, and that the main point is that if there exists a certain impaired vital activity in the cells of the body, *then* the germ of tuberculosis grows, and not otherwise; and that probably most of us occasionally inhale the tuberculosis germs without evil effects; or for that matter we may have the germs always present in the body, but they do not develop and grow, because the cells have not the peculiar impaired vitality which is necessary to foster the germ development. I think it is a mistake to think that consumption hits one like a bullet in battle; because the germs are flying around thickly, and one is under fire, as it were. The probability is that all are hit, and only those who are in a bad condition physically develop the disease, while those in good condition do not, the good and bad conditions being only terms to express an idea of cell resistance, and not the actual appearance of people, their feeling of good or ill health, etc.

There is also a possible danger to be remembered, that one who already has the disease may be reinfected by the carelessness of others. In case the patient has long-continued diarrhœa, with pain in the abdomen, it is safer to add a five per cent. carbolic acid solution or a strong solution of chloride of lime to the passages. Sheets, pillow-slips, or handkerchiefs, if they are soiled with sputa, should be immediately boiled in a separate receptacle for at least half an hour. In using a room previously occupied by a consumptive, the first precaution is to leave all the windows open for several days; remove all draperies, and hang them out in the sun for a day; then beat them vigorously and hang them again in the sun. Have all the carpets and rugs steam-cleaned. The walls should be rubbed down with bread and the woodwork thoroughly scrubbed; all furniture should be wiped carefully with a bichloride of mercury or carbolic acid solution. Then after the mattresses have been beaten and sunned, the sheets and blankets washed, and the room fumigated with formaline vapor, all precautions have been taken. I do not say that all this is necessary, but if

Reinfection

Further Precautions

Room

Disinfection of Room

people are anxious and desire to be absolutely on the safe side, it will at least give assurance of safety, and it is far better to be over-cautious than the reverse. No dust should be raised in sweeping and dusting a room occupied by a consumptive; rugs should be beaten out-of-doors, and carpets should be brushed with wet tea-leaves or bran on them; all dusting with a feather duster must be prohibited, a damp cloth being used instead. Above all, fresh air and sunlight must be allowed to enter freely during such operations.

Dust

CHAPTER III

HOUSE HYGIENE

House Hygiene

IF the consumptive is fortunate enough to be able to select a house to suit him, wood construction is to be preferred to stone in most climates, as it is less apt to retain moisture. Choose a house which is open all around to the air and sun, and which is not shut in by heavy trees or shadowed by adjacent buildings. See, if possible, that the ground is well drained, the soil porous—as sand or gravel,—and that the house is not built in a hollow, or the foundation placed below the level of some adjacent stream or other body of water. The house should be sheltered, by hills or trees, from the north and east winds, or those most prevalent and cold. The cellar ought to be well cemented, with walls dry at all times. The windows should be large, and numerous enough to permit light to enter the room even to excess. A porch or piazza on the south side of the house, to serve as a living room, is almost a necessity.

Situation

The heating of the house is of great importance in a climate like that of the temperate zone. The objection to hot water or steam, if it is done by the direct method with fixtures in the room, is that the ventilation must depend on windows. The furnace is often an abomination, with its gases and over-dried air; even the primitive fireplace, or stove, is an improvement, as these at least insure some supply of air. Gas stoves must be prohibited, at least such as are generally used. The best method of heating is an indirect system from coils in the cellar, the heat and supply of air being controlled automatically. The temperature of the room is controlled by a thermostat, and all air is passed through screens and then supplied with moisture, while each room is separately ventilated from above with outdoor air. This, however, is expensive, and not within the reach of the average patient; therefore an intelligent use of imperfect mechanical appliances will have to suffice in most cases.

Heating and Ventilation

"The air during its stay in the pulmonary cavity acquires not only a dangerous proportion of carbonic acid gas, but also organic impurities, waste matter thrown off from the blood and from the lung substance. Thus vitiated, it is unfit to be again breathed.

"The exhalations from the lungs are but one of the many causes conspiring to deteriorate the atmosphere. All the other excreta, notably that of the skin, lend their aid, and there are frequent sources of impurity external to the body. All combustion exhausts oxygen and liberates injurious gases. A single ordinary burner of illuminating gas in the room consumes more oxygen than would be required for three additional persons. Add to this the inevitable floating dust from floors and walls, from clothing, bedding, and furniture, and it becomes evident that with such impurities continually and from numberless sources arising, the question of the removal of the vitiated air, and the introduction of such as is fit for use, is one of the greatest importance even under ordinary circumstances."[1]

Room

The room occupied by the consumptive should be cheerful and bright, facing south, or, if possible, with windows both south and west or east. The windows should be large.[2] If possible, the room should be large and high, as such a room is far more easily ventilated without draughts than a small room. The invalid's room should be on the second floor, unless in a very dry climate.

Walls

The walls should be oiled, painted, or covered with some light, glazed paper (the glazed paper made

[1] Weeks, *Text-book of Nursing*, pp. 73–74. New York: Appleton & Co., 1890.

[2] Thirty cubic metres per bed, cubic air space. Schmeeden, International Tubercular Congress, Berlin, 1899.

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for bath-rooms, now manufactured in many varieties, offers an even, non-absorbing surface that can be washed and revarnished, and which also reflects much light). Dark corners must be avoided by all means.

Curtains, although dear to the feminine mind, must be sacrificed, unless it be small sash curtains that can be easily detached and washed, and which, if made of some white material, do not intercept much light. Windows may be fitted with frames covered with cheesecloth, which intercepts dust and allows air-interchange. The better plan is to open all the windows, protect the bed by its situation and by means of screens from direct air currents, and increase the heat so as to compensate, except in very cold weather, for the lowered temperature; over-ventilation must be the aim. A story is told of an Irish physician whose family history was tubercular. He had lost many of his relatives, including some of his own children, from consumption, and, although he lived in an inclement climate, he removed every window from his house, and for fifty years or more no consumption, or for that matter other illness, occurred in his family.

Curtains

Windows

Simple furniture is advisable ; an iron or brass bed, with a down quilt and new blankets for warmth without weight ; a steamer-chair, with cushions, is a sensible lounging chair. Floors should be oiled, waxed, or covered with linoleum, with a rug that can be beaten daily ; such a floor is much to be preferred to any carpet. In fact, a carpet of any sort should not be used, as they collect dust—and dust is a danger ; matting is even worse in this respect. Electricity should, if possible, be used as the artificial light, as the rays are valuable, and the air is not vitiated by combustion. As was above stated, the average lamp or gas-burner uses up the fresh air as rapidly as several persons would by breathing it.

Furniture

Light

CHAPTER IV

OUTDOOR LIFE

ROOM life is not the right life for the consumptive, and the less time spent indoors the better. Those, however, who are too ill to be outdoors, or those invalids who are in a chronic condition and very sensitive, are often forced to spend much time indoors, especially in moist and cold climates. The proper place, however, for the average pulmonary invalid during his waking hours is outdoors, if there is a fighting chance for his recovery. Occasionally, of course, this statement can be reversed. I have known invalids that were especially sensitive to sunlight, cold, wind, and any of the many interruptions that a life out-of-doors during the daytime implies, who do very well in a dry climate by spending all day indoors with, of course, special attention to room ventilation, and then sleeping outdoors all night; this insures their having outdoor air for twelve out of every twenty-four hours. Very frequently

such patients, especially during warm weather, seem to be made much more comfortable by this arrangement, and to improve quite as rapidly as those who spend the twelve hours in the open air during the day. Of course there is some loss of light in taking the fresh air only at night.

Piazza Life

The piazza offers many advantages; with a little care it can be made as comfortable as a room. It should have a roof, — in cloudy climates this ought to be constructed of glass; it should also be enclosed in fly-screens with canvas curtains inside. There should be a rug and other requisite furniture, including a bed and, for cold weather, a large stove or steam pipes — although this last is not at all necessary. The bed can be made of feathers with a down quilt. Feathers are strongly condemned by some authorities, who say they should never be used. Probably they are thought to be too enervating, and this may possibly be true of indoor life or in a damp or warm climate. But I have found in a dry climate during the cold of January and February, that a feather bed is excellent for a patient who is sleeping outdoors without artificial heat, although if instead of the feathers

Furniture

Hair Mattress

there is first a thick hair mattress and over this a woollen mattress, the cold is not felt. An invalid can thus have practically all the comforts of a room, with the great advantage that, day and night, he is breathing fresh, outdoor air, and does not regard it as a task. A piazza on the second story, with a door leading into the house, is to be preferred, as seclusion can be more easily maintained, and the air is less apt to be damp. To have the piazza entirely enclosed in glass is a mistake; this insures light, but such a place is often badly ventilated.

Sitting out

If it is impossible to arrange for the furnished piazza, much can be done with an ordinary porch. Screens can be made of canvas so as to protect the patient from the direct wind, but care must be taken that the curtains are not held too loosely with rings which will rattle in the wind. A steamer-chair, with a steamer-rug of wool to entirely enclose the body, and in very cold weather hot-water bottles or soapstone heaters to give the patient the necessary heat, are the first things for his comfort. A fur overcoat and the thick woollen socks that lumbermen use are of much service in some cases, and often prove to be necessary in climates of

much severity. Chairs with hoods and various kinds of screens are in use, especially abroad,—even a complicated kind made so as to revolve and present the back to the wind. The wind, in the open-air life, is probably the most disturbing factor in most of the climates where it is possible to be out at all. Cold, even intense in degree, can be endured with comfort until the wind rises; it is for this reason that extra clothing must be always near at hand, and that there should be several places selected so as to be used at different times with shelter always available. On the other hand, in warm weather the invalid must be protected from the sun, at least to the extent of his head and shoulders. Hence on warm days a piazza on the north side of the house should be used, because even the reflected rays of the sun are exhausting in really hot weather. A piazza with a south exposure is entirely too warm a place for any invalid during the summer months, at least on average summer days from 10 A.M. to 4 P.M. in the temperate zone. Heat, it must be remembered, is not only more exhausting but more dangerous to the tubercular invalid than a similar extreme of cold is, in spite of the popular impres-

In Winter

In Summer

sion to the contrary, and personally I would prefer the cold of the arctic zone to the heat of the tropics as an agent in arresting tuberculosis.

Tent Life

I consider that, for certain cases, life in a tent is the nearest approach to the ideal existence for the consumptive. I mean, of course, that there should be a careful selection of the patient who is to pursue such a life, and then a careful selection of tent, camping site, etc., all of which is so essential to success. To most people a tent means simply such a one as is ordinarily used in camping expeditions; and it is this limited knowledge of tents that has brought them into disrepute with many physicians. Those generally used are too low; they are made of thin duck, are often without a floor, and do not have proper artificial heat, and are pitched in the open, becoming like an oven in the sunshine. Above all, such a tent has no suitable system of ventilation, a matter of considerable importance, since a tent never ventilates itself properly by air which comes through the canvas, as some people seem to think. The tent I have in mind is the result of considerable evolution in tent building, and although I have not yet been able to demonstrate its use with a large number of patients, I

have myself lived in it, both summer and winter, during rain- and snow-storms, and for several weeks at a time.

The Tent

It is made of very heavy duck (12 ounces); it is circular in shape, and is 18 feet high, being 16 feet in diameter at the floor, with a wall 5 feet 6 inches high. The top terminates in an iron ring one foot in diameter to which the canvas is fastened, thus furnishing an ever open outlet for the heated air. The tent is supported by a centre pole to which the ring is attached, and, by means of pulleys operated from within, the canvas can be elevated or lowered or its tension changed at will. The floor is raised eight inches from the ground, and is in eight sections, so that it can be easily moved. The lower edge of the wall is fastened several inches below the floor and one inch out from it all around; this is to

Ventilation

insure at all times an inflow of air that is gradual and without draughts, since this inch space in a circular tent represents an area of 600 square inches, and the hole in the top for overflowing air has an area of some 123 square inches. In this way the tent cannot be closed, and is ventilated automatically and constantly. In other words, this is a circular tent

with the bottom of the canvas forming a circle around the wooden floor, and one inch out from it all around, and also extending a little below. This open space between the floor and the sides of the bottom of the tent allows air to flow in at all times ; while the hole in the apex, or top, allows air to flow out all the time. In this way the tent always ventilates itself day or night, whether the door is shut or not, whether the interior is heated or not, or in any weather. As the air has to turn a corner to enter the tent, it cannot come as a draught, and as it passes in through all the inch space surrounding the tent, it enters slowly and without force, being evenly distributed, but coming through, collectively, a large area.

Furnishings

The tent is easily heated by a wood- or coal-stove. In warm weather the interchange of air keeps the interior cool, even without a fly. This tent should be fitted up in every way like a room. Cooking need not be done in it, but can easily be provided for at a house near by. Such a tent can be inhabited for at least eight months of the year in Colorado, at 6000 feet altitude, and in the winter it can easily be transported, if necessary, to a warmer southern climate.

The advantages of such a life are that one obtains plenty of fresh air and diffused light without effort during all of the twenty-four hours. The psychological effects of this life cannot be told here; but that it is a constant mental rest, that the novelty charms, and that a certain something, possibly the awakening of the hunting and migratory instinct, inherited from countless generations of primitive ancestors, does affect beneficially the nervous system of the phthisical, is undoubted.

Advantages

I do not think all climates are alike suitable for living in tents; many are too damp, or the cold and damp together make it impossible for this life to be of advantage, at least during most of the year. The care with which shade should be sought in summer cannot be too much emphasized. In Colorado, during the past summer (1899), I took a series of comparative temperatures, placing my tent in a perfectly exposed place and not shading it in any way (the ground around it being light in color and bare of grass or other vegetation calculated to temper the reflected heat). I found, on the warmest days, that in my office, which faced north and east, the

Climate in Relation to Tent Life

Shade

temperature would be 74°, while in the tent at the same time the thermometer registered 112°, a temperature quite dangerous for the pulmonary invalid to live in. The tent, if placed under the shade of big pine trees, is comfortable at all times in Colorado, the temperature rarely going above 80° in the hottest weather, and then only for four or five hours during the day.[1] Great caution should be observed by the pulmonary invalid who is to live in a tent, as the air inside of the canvas is most sensitive to changes in any climate, either of temperature or of humidity. A fire should always be lighted an hour or more before changing clothes, going to bed, or in any way exposing the body to a chill. To leave a warm room where the evening has been spent and enter a tent, or go to bed without having such a tent properly heated, is to invite an attack of pneumonia. The same precautions should be used in the morning; do not get out of bed until a fire has been started long enough to dissipate cold and moisture, or the sun has warmed the air.

Cold. Damp

The same rules apply here as to piazza life. If

[1] This would be only 70° in a moist climate; 80° F. in Colorado feels about 70° F., it is so dry.

the cold is felt, or it is damp and rainy, with a temperature of 50° to 40°, some artificial heat should be employed, or the patient must sleep in the house that night. Also at sundown, the temperature in many climates, especially in elevated regions, is subject to great and sudden changes which must be carefully guarded against; and, above all, the invalid who is to live in the open air must first be examined by his physician, as there may be, in even what are apparently the most favorable cases, good reasons why such a life must be avoided, since to such an invalid it might mean great danger to life. Moreover, the outdoor life should, if possible, be entered upon slowly, since by gradually accustoming the patient to this change the risk is greatly diminished. This can easily be accomplished by having the patient sleep out at first during some warm weather in the summer, and, after a few nights spent in this manner at a time of year when it is more a relief than anything else to sleep out-of-doors, the gradually changing weather of fall and then winter can be borne without discomfort or danger.

General Rules

The bed should be warmed by a hot-water bottle. The night clothes must be made of

woollen; in very cold weather woollen socks should be worn, and also a woollen abdominal bandage; while the head, which is exposed, must be protected by some warm cap. The clothes to be worn during the day must be kept in the house and warmed before being taken out to the patient in the morning; or, better still, the patient, clothed in a warm dressing-gown, can proceed to a warm room to dress. With these precautions, the most delicate invalid can, with impunity, live the outdoor life I have suggested, without danger at all and with marked benefit, as cold is the best medicine one can have for consumption, provided it is properly controlled and the cases are selected by a physician.

CHAPTER V

FOOD

IT is hard indeed for a student of pulmonary consumption to sufficiently emphasize the immense importance of food as a cure, or rather nutrition which depends upon food. Doubtless many thousands of lives have been sacrificed yearly all over the world from the want of proper dietetic knowledge, either not enough food having been taken, or food being improperly prepared, or of a character not suitable for nutrition.

Want of Knowledge

If, as the old adage has it, "the way to a man's heart is through his stomach," the way to his lungs is certainly by the same organ, and properly digested food often means life, while lack of it is more to be feared by the consumptive than any hemorrhage, high temperature, or other ills which he so greatly dreads. And yet the average consumptive, beyond having some vague idea of what he ought to eat, often throws his chances away from lack of knowledge. He fre-

quently has dyspepsia, does not care for food, and decides at once that he must eat less as his stomach is overloaded. The real reason is that he is weak because he does not have enough food of the right sort, or that it is poorly prepared, and often taken at improper times. Such an invalid will at once see the necessity of controlling a business by business methods, often the result of years of experience, but will be astonished at the necessity of proceeding along exactly the same lines in his own case when he is being cured by scientific feeding, and will think he should be the best judge as to what nourishes him, although he may be profoundly ignorant of the first principles of dietetics.

Chief Article of Diet

The chief diet for the consumptive undoubtedly ought to be meat,[1] or food having as nearly as possible its nutritive value and digestive simplicity. This has been clearly established both by theory and practice. It has long been known that, when animals are living under the same conditions, the herbivorous animals are far more likely to develop consumption than the carnivora, or meat-eaters, — 26 per

[1] C. Richet, *Bulletin de l'Académie de Médecine* (Paris), November 28th.

cent. of the vegetable eaters being attacked, as against 3 per cent. of the meat-eaters. The proportion is also very nearly the same among birds, the grain-eaters suffering far more frequently than the carnivorous, or birds of prey.

Individual Element

The proper diet of the consumptive patient is not alike in all cases. If the patient can be up and about, taking a fair amount of exercise and having no fever, the diet can be more liberal than if he is confined to bed, has a high temperature and, as is often the case, catarrh of the stomach. Such a case must be restricted and food should probably be given mostly in a fluid form. It is, however, with extreme difficulty that any rigid diet can be safely advised for the invalid, as the individual element enters so largely as to make, even in tuberculosis, very wide differences.

"Stuffing"

A word of warning needs to be inserted on this point—that is, in regard to the statements made by some of our best and most skilful physicians here and in Europe, statements that lead one naturally to suppose that the whole curative process in consumption rests entirely upon giving an excess of food, or, as it is commonly called, "stuffing" the invalid. No

doubt, in a certain number of cases, forcing nutrition by such violent methods saves life, and it is also no doubt true that, speaking generally, in a wasting disease like consumption, over-nutrition is the Mecca towards which all our efforts must be put forth, as nutrition is undoubtedly the keynote to a successful arrest or cure of the disease.

But food is clearly a double-edged sword ; we physicians see many wrecks along life's path, whose untimely end or suffering is entirely dependent upon the abuse of their stomachs by over-feeding. This can be no more true of the average individual than it is of the consumptive. We read interesting accounts from foreign sources of the patients at these admirably conducted resorts who would eat two dinners at one time, leave the table to vomit, and then be ordered again to the charge ; or of the placid individual who first has his stomach washed out, and then has an excess of food poured in, the undigested excess being in turn washed out before the next filling. And finally we read of the rapid gain in flesh such patients are said to achieve. All this sounds more or less attractive, especially the gain in weight reported, but such methods are, I fancy, really practical in comparatively few cases only.

At least in treating Americans we must be careful not to apply such Spartan rigor to our patient's dietetic management.

Dyspeptics

We frequently encounter the consumptive whose stomach has to be handled with the utmost care,—the thin, nervous type, with dark, bilious skin, quick of speech and gesture, whose energy has been well-nigh expended upon a life-work, and who has a small stomach, with acquired or inherited dyspepsia. Such invalids will not tolerate any stuffing ; and in fact they frequently have to be strictly dieted before any progress is made, and even then there are periods when for a day or so little food can be digested, and any set rule applied by the enthusiastic advocate of forced feeding will end in disaster.

Fatty Degenerates

The other extreme, those people who seem to absorb all they eat and become flabby and fat at short notice, have also a danger before them, if enthusiasm leads them to suppose that fat and weight are the objects sought. Active tubercular process can go on coincident with a rapid gain in flesh. Embarrassment of the heart and lungs, if not actual fatty degeneration, is also the frequent outcome of over-feeding

in such people, whose powers of absorption are no indication of health. Such cases should bear in mind that muscle and firm flesh are a far better protection against the inroads of consumption than fat, and that often a gain in adipose tissue is like adding freight to a leaky ship.

In dealing with the stomach of the average civilized patient, one hesitates before any attempt is made at definite or arbitrary statements regarding special diets. Nevertheless there are certain broad principles as to nutrition and digestibility of food that are well worth our attention and study, especially when we are dealing with a disease like consumption, which is essentially a disease due to malnutrition. The effort, in feeding the consumptive, should be directed, therefore, to giving not only the most easily digested foods, so that the system can immediately take advantage of the supply offered to it and at once make new cells to replace those lost by disease, but, in addition to this, the food should be of a kind and quality to make new tissues as quickly as possible after it is digested. In an advance upon an enemy, the troops may be mobilized with all facility and brought before the enemy, but they must also come with weapons

How to Feed

well prepared and with a supply of ammunition, or the speed in the transit has been useless.

Patients should never swallow their expectoration, because it is liable to give gastric catarrh, and, possibly, to infect the digestive tract lower down (the small intestines, for instance).

Swallowing Sputa

Remembering, then, that the chief business of a consumptive is to recover, and that proper food will most often accomplish this, if given freely, we can outline a day's food supply for a patient in bed, or on a reclining chair outdoors, who has to remain quiet on account of having fever, or a temperature of 101° and over.

FOODS: Morning on Awakening

At 7 A.M., half pint of milk (good milk, and not blue or skimmed milk). This can be taken cold or warm, and is often more palatable if diluted with one third lime- or soda-water, or taken with Mellin's Food, or with two teaspoonfuls of arrowroot added ; especially is this useful in cases where some diarrhœa arises from indigestion (as when the milk forms curds or does not otherwise agree) ; or add a teaspoonful of salt and take the warmed milk slowly (sipped, if possible).

7 A.M.

A cup of coffee, made by adding a tablespoonful of coffee (as ordinarily taken) to a cup of hot milk; or a cup of cocoa, made with milk (Phillipp's "Digestible" is an excellent cocoa); and two pieces of dry toast with a little butter; or zweibeck instead of toast. 8.30 A.M.

Half pint of mutton or veal broth, or beef tea, with toast and butter. 11 A.M.

Milk coffee, as at 8.30 A.M. Rusks or toast; stale bread and butter or English breakfast biscuits. 4 P.M.

Cup of milk with Mellin's Food, or malted milk and a cracker. 6 P.M.

A cup of meat broth, chicken, veal, or beef. 8 P.M.

During the night, drink milk and soda-water, if thirsty, or malted milk alone; or chew a tablet of malted milk. (This diet represents, roughly, proteids 600, fats 80, carbo-hydrates 250.) Night

Milk can be made more palatable to some by adding a simple flavoring, such as vanilla or cinnamon. And milk may be thickened with a grain preparation — Imperial Granum, for instance, — or peptonized, to render it more digestible, by Fairchild's peptonizing tubes.

In a few days this routine will, no doubt, become tiresome, or dyspepsia or headache makes a change desirable and wise. In place of the milk, freshly made kumyss can be given, or matzoon or kepher ; and in place of broth give a soft-boiled egg. A raw egg, if desired, can be taken ; first put a teaspoonful of lemon juice, then an egg raw, then a teaspoonful of lemon juice, or simply the whites of several eggs beaten up in a cup of water with lemon juice,—and swallow all together. Poached eggs may also replace the raw eggs. If the whites of eggs are squeezed through a fine cloth before beating up in water, and then taken, they are more digestible than when the yolks are also used. Raw oysters can be used in place of eggs. Milk should always be taken slowly, and not gulped down (taken through a glass tube is a good way to insure this). Ice must not be put in the milk ; cool by placing the glass near ice, and do not allow a glass of milk to remain in the room without being covered, — dust and germs both will enter it ; and never keep milk at room temperature, unless on ice, longer than one hour. Bottled milk must be shaken before it is poured into a

Change Frequently

Milk Taken Slowly

glass, or the cream on top will be given, and possibly disagree with the patient. In making toast, use stale bread, cut thin, and toast quickly. Pure meat juice is probably the most valuable liquid food that can be used. This is made from round steak, broiled very quickly over a hot fire, so as to "do" it "rare," cut into cubes of half-inch square, then squeezed in a lemon squeezer or a regular press (the Enterprise Meat Press is practicable and quick); add one third water, and warm it enough to take,—being careful not to overheat, as white flakes of albumen will then appear. This can be seasoned with salt and pepper, and may be taken in place of milk several times a day. It should be made fresh and kept covered (on ice) till used. A few drops of Worcestershire sauce may be added when it is served. The juice can also be poured on stale bread and eaten in that way, or the yolk of an egg may be added to the juice.

Cream on Milk

Meat Juice

I quote here a specimen of a diet prescribed by a German physician,[1] which may be of interest to the reader as showing how different our treatment is in America.

[1] Dr. Carnot, *Die Tubercu.*, p. 480, "On Nourishment."

It is not enough merely to say to the patient, "Eat plenty, drink much milk, and go to walk regularly." We must prescribe the exact hours for meal times, and possibly indicate the quantity and quality of food. The bill of fare to which, with many individual modifications, I have confined my well-to-do patients for eleven years, is as follows:

First Breakfast 7-7.30 o'Clock — One quarter to one half litre (one half to one pint) of milk (cocoa or coffee); with one or two eggs, or gruel, or meat, or bacon; bread and butter.

Second Breakfast 9-9.30 o'Clock — One quarter to one half litre (one half to one pint) of milk, or one tenth of a litre (one tumbler) of strong wine, sherry, port wine, Malaga, Marsala; bread and butter, possibly sandwiches.

Before going to the table a rest of from one quarter to one half an hour should be taken.

Dinner 1 o'Clock — Soup—*entrée;* fish, roast meat, game, poultry, with vegetables; stewed fruit and salad; pudding; butter and cheese, with one tenth of a litre (one tumbler) of red wine or a quarter of a litre of beer. After leaving the table a rest of from one half to one hour should be taken. The patient should sleep during this time if possible.

Afternoon Lunch 4 o'Clock — One quarter to one half a litre of milk or cocoa with one or two beaten eggs; bread and butter; honey.

Before supper take a quarter to half an hour's rest.

Supper 7 o'Clock — Broiled or roasted meats; vegetables; cold cuts (bacon or pork); bread and butter; one tenth of a litre of red wine or a quarter of a litre of beer or milk.

9 o'Clock — One quarter to one half a litre of milk; one zweibeck or bread.

The rest before meals, which is ordered also for comparatively strong patients, promotes assimilation.

In order to have a rule to follow in our nourishment therapeutics, we must keep ourselves informed of the weight condition of each patient. We do not know the relative normal weight of the patient, which differs according to age, size, height; there are no tables for a basis as yet. The patient should be weighed once a week, after evacuation and before breakfast, in the same clothing, and a table kept of the weights. The weight furnishes a guide to the plan of diet. It is well for the relatives or companions of the patient to note the quantity and weight of food consumed. Leyden and Jacob have prepared good food tables.

Weight.

A healthy, active man needs daily, according to Voit and Reibner, about 120 grams of albumen, fifty grams of fat, and five hundred grams of carbo-hydrates. It is important to notice the heat value of the foods.

Amount of Food

Albumen	provides	4.1	heat units per gram.
Fats	provide	9.3	" " " "
Carbo-hyd.	"	4.1	" " " "

Albumen,	$120 \times 4.1 =$	492	calories.
Fats,	$50 \times 9.3 =$	465	"
Carbo-hyd.,	$500 \times 4.1 =$	2050	"
		3007	"

The capacity for nourishment of an idle or resting man is about 30–35 calories per kilo (2 lbs.) of the bodily weight, that of the moderate working man about 40 calories. An adult of middle weight wastes about 3000 calories, and the nourishment must correspond to this amount of heat waste. The consumptive needs more, as emaciation shows a loss of nourishment of 24–27 calories per kilo of the weight.

In the list of liquid and semi-liquid foods given in this book, a choice can be made that will prove palatable. Above all things make the tray that goes to the invalid's side attractive. The consumptive, especially if confined to bed (often with fever and possibly some indigestion as well), positively dislikes any food, or the mention of food; nevertheless food is his salvation, and must be given. In a case such as this it will take all the tact and adroit management at command to induce the capricious and fretful invalid to take enough nourishment under the best condition of service; and when the articles are served half warmed, with a soiled napkin or tray, or in too large quantities, the result is apt to be a failure; no amount of resolution on the patient's part will enable him to overcome his first impression, which acts as an auto-suggestion so strongly as probably even to interfere seriously with digestion. Of course, such mistakes are not usual when an efficient trained nurse is in attendance, but this advice is not intended for such cases. The china should be attractive and delicate, and scrupulously clean; the napery, not only clean, but of good quality; the food, served

The Service

Neat and Artistic Service Valuable

in as tasteful a way as possible,—a little parsley around a chop, bread cut thin and in half slices, the butter on a separate little butter-dish, a small pewter cover for the meat to keep it warm, cocoa and coffee in a suitable china pot, and not anything in excess, but only just enough. All these factors seem trivial, but I am convinced from experience that the psychological effect of such artistic care in serving has a decidedly beneficial influence on the patient's mind; thereby the mind influences the digestive processes, and that, often, decorated and artistic china does influence nutrition in spite of its seeming absurdity. The patient who is up and about is not, as a rule, so apt to be sensitive to impressions, but even with such cases no care is too great when trying to make the food attractive.

Art in Preparing and Serving the Invalid's Tray and Food

I quote here from Clara S. Weeks's *Book of Nursing* some useful instructions[1]:

Instructions to Nurses

What kind of food is to be given in each case will usually be decided by the physician; how best to prepare and administer it are matters for the nurse to know. Everything should be the best of its kind, well cooked, palatably

[1] Clara S. Weeks, *Text-Book of Nursing*. New York, 1890.

seasoned, and attractively served. Consult, as far as possible, the known tastes of the patient; but do not each time ask him what he would like. Something unexpected will often be acceptable, when to have thought about it beforehand would have taken away all appetite for it. His food should never be prepared in his presence, nor the smell of cooking be allowed to reach him. if it is possible to avoid it. Your own meals should never be served in the sick-room; it is equally bad for nurse and patient. Serve everything as nicely as may be, always with a clean napkin, spotless china, shining silver and glass. Have the dishes dry on the outside, taking particular care that nothing gets spilled from the cup into the saucer. This point needs special emphasis.

How to Serve the Food

Have hot things very hot, and cold ones really cold. More salt and less sugar will generally be wanted than in health. Highly seasoned food is not good or often wished for, but everything should be agreeably flavored and of good quality: eggs above suspicion, milk always sweet, and butter fresh. The two articles last named ought always to be kept cool and closely covered, for they absorb the odors of whatever is near them. The least taint in any kind of food should lead to its rejection and the substitution of something else. Before taking food to the sick, you should always taste it to be sure that it is just right, but on no account taste it in his presence or with his spoon. Whatever is not eaten should be at once taken away, as to leave it in sight, in the hope that he will want it a little later, is worse than useless. It is always better to bring too little rather than too much.

Weak Digestion

A weak digestion cannot manage a load, but must take little and correspondingly often. It is not wise to overburden the patient's stomach in your anxiety to make him take plenty of nourishment, for it is not what is swallowed, but

what is digested, that does him good. When only a very small quantity can be retained, it should be in a highly concentrated form. Where there are nausea and diarrhœa, give but little at a time, and always cold.

Regularity in Feeding

Ascertain from the doctor how much he wishes the patient to take within the twenty-four hours, and, dividing it up into suitable quantities, give it at regular intervals. The importance of regularity can hardly be too much emphasized. If given punctually at fixed hours, a habit not only of taking but of digesting the food will soon be acquired, for our most automatic functions are influenced by custom. Each time a patient is fed, a note should be made of the kind and approximate quantity of nourishment taken. Only in exceptional cases should he be roused from sleep for food, but a supply should be provided for use during the night, as it may be most important to have it at hand. Put it in the coolest place and cover to keep out the dust. Some light nourishment the last thing at night will often help to send the patient to sleep.

The Helpless Patient

In feeding a helpless patient, give the food slowly and in manageable quantities, letting each morsel be fairly swallowed before another is given. If there is difficulty in making him swallow, it will be lessened by taking advantage of his inspirations. See that the head is not turned to either side—even a slight inclination may cause the liquid to run out at the corner of the mouth instead of down the throat,—have the clothes well protected, and take pains not to make an external application of the food. A feeding-cup with a spout may be used, but, unless the patient is able to control it himself, it has the disadvantage that the nurse cannot see how fast she is pouring its contents. Fluid food can in most cases be taken more conveniently by suction through a bent glass tube, and patients will often take a larger quantity this way than

they can be induced to take in any other way. After feeding, always dry the mouth, especially at the corners, if the patient cannot well do it for himself. The lips not infrequently become sore from want of this little care.

With fever, there is often great thirst. Usually it will be quite safe to allow the patient all the water he wants.

Drinks

If not, it is worthy of note that a small glass *full* will be much more satisfactory, especially to children, than the same quantity in a larger vessel. Slightly bitter or acidulated drinks slake thirst more effectually than water alone. Bits of ice are often

Ice

very refreshing and always harmless. They may be easily split off with a pin, in the direction of the grain. Small bits swallowed whole are excellent to control nausea. Ice, to keep well, must be placed so that the water will drain off as fast as it melts. Small pieces may be kept in a glass for some time by suspending them in a flannel, in which one or two holes are snipped for the water to run through. Confine it by an elastic band around the edge of the glass. A metal spoon in the glass helps to melt the ice by conducting away the heat rapidly. A newspaper wrapped around the ice pitcher, being, on the contrary, a very bad conductor, will help to preserve it. Ice, to be taken internally, must be clean, and that not only on the outside. It is a great mistake to think that all deleterious substances are disengaged from it in freezing. It is as

Water

necessary to have good ice as pure water, which is of recognized importance. Pure water should be transparent, sparkling, colorless, and odorless, though these characteristics do not prove it such.

The invalid who is able to take a little exercise, such as walking out on the piazza, or from room to room, can be given food in a more solid

form, or a diet corresponding in most respects to the average diet of well people, with, of course, more attention to nutritive and digestive values. These patients should have, while yet in bed, one half pint of warm milk, or milk coffee, and a piece of toast. Breakfast should be served in less than an hour after, and should consist of eggs — soft-boiled, poached, or raw, — mutton chops or broiled steak, poultry, sweetbread, scraped raw meat, sardines, if found digestible, or bacon cooked crisp; mush of several kinds, provided it is boiled at least four hours.[1] Fruit can precede the breakfast: grapes, oranges, apples (stewed), or fruit juices (pineapples, bananas, and all tropical fruits are not allowed). The bread should be two days old, or, instead, French rolls may be used. (Do not use hot bread or cakes.) For a beverage, coffee, cocoa, or bouillon are excellent. The food must be eaten slowly; imperfect teeth should be attended to in order that the food may be properly masticated.

Food for Walking Cases

Before Breakfast

Breakfast

[1] Never mind what the directions on the package say about two or twenty minutes, as they are not always reliable.

This meal should be taken in the middle of the day, unless the patient's habits make it decidedly objectionable. The dinner can be much like the breakfast, and should consist of roast beef, mutton, turkey; vegetables — baked potatoes, for instance, or well-boiled spinach, easily digested peas, corn, cauliflower, lettuce with lemon juice; game, such as boiled or roasted partridge, squab, woodcock, snipe, prairie chicken, or quail; and, as a vegetable substitute, macaroni or spaghetti, cooked without cheese; some light pudding, such as rice or bread pudding or that made from stewed fruits; ice-cream (taken with caution).

Dinner at Noon

At four o'clock the patient should be given a lunch consisting of: milk toast, scraped meat, or a cup of milk; bouillon, crackers or zweibeck; cocoa, beef juice, milk punch or egg-nogg, raw egg, broth, clam broth, or a few raw oysters; possibly tea with a dash of rum; and sandwiches made with jelly or Dundee marmalade, or English breakfast biscuits. Panopeptone is useful. It is sometimes well to vary by using Racahout des Arabes, beef cocoa (Mosquerás), the yolk of an egg added to a meat ball, or scraped raw meat.

4 P.M.

Supper may be made from tropon stirred into milk or broth; cold meats or warm chops or steak; broiled fish or trout; no canned foods of any sort, except sardines. This meal should be taken some time between six and eight. Some people have peculiar tastes and have to be humored, even if the foods selected do not seem of the best; provided they digest them, they may be valuable in selected cases, and such foods may act, by their presence, as a stimulant to digestion.

Supper

By following the rules which I have given in regard to food, a consumptive can, if cautious, dispense with such artificial preparations as are generally used, and which are often of doubtful value; even cod-liver oil, although a food, can often be supplanted, and to advantage, by other forms of nutrition which the human animal was evidently intended to use.

Dietetics

The following formulæ, gathered from various sources,[1] will, I hope, be valuable as hints toward proper nutrition.

[1] Gideon C. Segur, M.D.

1. Milk

Two (2) ounces of fresh milk and one ounce of seltzer, Vichy, or other carbonated water.

2. Milk.

Three (3) tablespoonfuls of milk, one (1) tablespoonful of lime-water, and one (1) tablespoonful of brandy or whiskey, or cream and Vichy water equal parts can be taken when milk alone cannot.

3. Milk.

Two (2) tablespoonfuls of milk, one (1) tablespoonful of *hot* water, and ten (10) drops of essence of pepsine (Fairchild's).

4. Peptonized Milk

Use Fairchild's peptonizing tubes; full directions accompany.

5. Junket

One teaspoonful of essence of pepsine (Fairchild's) added, with gentle stirring, to one half pint of warm milk; pour into custard cups and let it stand until curded. Serve plain, or with orange and grated nutmeg or lemon peel.

6. Whey

Prepare the curd as in No. 5, but in a single dish, then beat with a fork until it is finely divided, strain through cheesecloth, and use the whey seasoned to taste.

7. Whey with Wine

One wineglass of sherry, added with gentle stirring to one half pint of warmed milk, and when curded beat with a fork and strain.

Mix in an open dish, two (2) quarts rich milk, four (4) tablespoonfuls strained brewers' yeast, and three (3) tablespoonfuls extract of malt, and keep in a warm place four to eight hours, till fermenting well. Mix, tightly cork, and set in a cool place for twenty-four hours.

8. Kumyss

One dessertspoonful of malt extract and one fourth pint of warm milk.

9. Malt and Milk

Beat to a froth one fresh egg in a wineglass of water, continue beating while adding four ounces of fresh milk, one teaspoonful of brandy, and sugar to taste.

10. Egg, Milk, and Brandy

Beat one fresh egg to a froth, sweeten with sugar, add one half pint of warm milk and one teaspoonful of essence of pepsine (Fairchild's), gently stir until mixed and pour into custard cups.

11. Egg and Milk Junket

Beat one fresh egg in a wineglass of water with fifteen (15) drops of brandy and a little sugar.

12. Egg and Brandy

Carefully sprinkle into boiling water, to which a little salt has been added, oatmeal, wheat, barley, arrowroot, or rice flour, and continue boiling and stirring till smooth and of the desired consistency. May be given warm with an equal quantity of milk.

13. Gruel

14. Barley Water

Boil two (2) tablespoonfuls of pearl barley for one hour in one quart of water, replacing the water evaporated. Cut one lemon into thin slices in a bowl or pitcher with two (2) tablespoonfuls of sugar, and pour the boiling liquid upon them, cover, let stand until cool, and then strain. It is conveniently made with Robinson's Patent Barley.

15. Flaxseed Tea

Take two (2) tablespoonfuls of flaxseed, and after washing in cold water add one lemon sliced thin, and one (1) tablespoonful of sugar, place in a pitcher, and pour over them one (1) quart of boiling water, mix well, cover, and let stand in a warm place three (3) hours, and then strain.

16. Rice Water

Two tablespoonfuls of rice to one quart of cold water in a porcelain-lined saucepan ; boil till soft, strain, and add sufficient water to make one quart, sweeten to taste or flavor with some fruit juice. Extract of malt or one of the prepared malted foods will increase its food value.

17. Oatmeal Water

Made the same as rice water (No. 16).

18. Lemonade

The juice of two (2) large lemons, one tablespoonful or more of sugar, one pint of water, and a little grated lemon peel.

One half teaspoonful of bicarbonate of soda to half a glass of lemonade (No. 18); stir, and drink while effervescing.

19. Effervescing Lemonade

Soak one half pound of finely cut lean beef in one half pint of water and one half teaspoonful of salt for two hours, strain, and place the meat with one half pint of water in a glass jar in a saucepan over the fire to simmer for two hours, gradually bringing the water in the saucepan to a boil; strain, and pour the heated liquid and that in which the meat was soaked together, and add sufficient water to make one pint.

20. Beef Tea

After preparing beef tea as above, dry the meat in a warm oven, reduce it to a powder by pounding in a mortar, remove all stringy parts, and mix with the beef tea. Can be served with toasted bread or crackers.

21. Whole Beef Tea

Warm two ounces of fresh lean beef on a toaster over a quick fire and express the juice while warm with a warm hand-press (a nickel-plated lemon-squeezer will do nicely). (Bovinine, Wyeth's Beef Juice, Valentine's Meat Juice, etc., are preparations that can be procured at the druggist's.)

22. Beef Juice

Put finely cut lean beef into a wide-mouthed bottle and stand the bottle in a saucepan of cold

water; heat gradually for four (4) hours, but do not allow the water in the saucepan to boil; strain, pressing the meat to extract all the juice; add salt to taste. Give a teaspoonful or more at a time.

23. Beef Extract

Boil two (2) tablespoonfuls of pearl barley till soft in one quart of water, add a small teaspoonful of salt, and one half (½) pound of finely cut lean mutton, and simmer for an hour; when cool, strain. (Unstrained, it forms a nutritious food during convalescence.)

24. Mutton Broth

Wash carefully one dozen fresh clams (in shells), place in a saucepan with one half pint of boiling water, and boil for fifteen minutes. Season to taste, and strain through fine sieve or cheesecloth.

25. Clam Broth

Open one dozen oysters, and put, with their liquor, in one half pint of cold water, allow to stand for one half hour, drain off the liquid and place it in a saucepan over the fire, boil and skim; add one half pint of milk, and salt and pepper (if allowed) to taste, and when brought to the boiling point, add the oysters and pour into a hot covered dish. Serve in ten minutes, if the oysters are to be eaten; if not, cook fifteen minutes and strain.

26. Oyster Broth

Dissolve a little isinglass in water, then put half an ounce of freshly ground coffee into a saucepan with one pint of new milk, which should be near boiling when the coffee is added; boil both together for three minutes, clear it by pouring some of it into a cup and dashing it back again; add the isinglass, and leave it to settle on the hob for a few minutes. Beat up an egg in a breakfast cup, and pour the coffee upon it; if preferred, drink it without the egg. (Page 781, *Practice Dietetics*, Thompson.)

Nutritious Coffee

Pour two quarts of hot water over fresh, unslaked lime (size of walnut), stir till slaked, let stand till clear, and bottle. (Page 775, *Practice Dietetics*, Thompson.)

Home-made Lime-Water

To a pint of beef broth which has been carefully strained and seasoned and from which all the fat has been removed, add a teaspoonful of oatmeal, and boil gently for two hours. In this preparation the oatmeal should be soft and jelly-like, and if too much water evaporates during the boiling, add more water. (Page 777, *Practice Dietetics*, Thompson.)

Scotch Beef Broth

Two ounces of rump steak; scrape the steak with a sharp knife, and after removing all fat and

tendon, if not already in a complete pulp, pound in a mortar; flavor with salt and pepper. This may be taken in the form of a sandwich between thin slices of bread and butter, or mixed with water to the consistency of cream. If preferred, the meat may be rolled into balls with a little white of egg and broiled for two minutes, or until the outside turns gray—just long enough to remove the raw taste. (Page 773, *Practice Dietetics*, Thompson.)

Raw Meat Diet

This forms a very nutritious food. Take two tablespoonfuls of oatmeal and two of cold water, and mix them thoroughly; then add a pint of good beef tea which has just been brought to the boiling point. Boil together for five minutes, stirring it well all the time, and strain through a hair sieve. (Page 772, *Practice Dietetics*, Thompson.)

Beef Tea with Oatmeal

Three ounces of raw beef or mutton; one ounce of very fine bread-crumbs; one teaspoonful of sugar. Cut the meat very fine, rub it through a hair sieve, then pound it in a mortar into paste. Mix with it the bread-crumbs, sugar, a little salt and pepper, and spread it between thin slices of brown or white bread and butter. (Page 773, *Practice Dietetics*, Thompson.)

Raw Meat Sandwiches

The dyspeptic invalid should avoid made-over dishes, smoked or dried, trimmed or canned meats, fricassees, mayonnaisses, pork, duck, geese, sweets, pastry, anything fried, unripe fruits or vegetables, or cheese. Digestion is apt to be better when fever is lowest.

Tropon

Tropon is a food now rather widely used, and can be taken with yolk of an egg, or stirred into thin soups. It is said to be insoluble in water. It can be taken also in capsules or wafers. A teaspoonful is a fair dose. (Note.—A tasteless method of taking cod-liver oil: Put in glass a tablespoonful of Welche's Grape Juice; moisten the glass with the juice up to the rim; float on the juice a tablespoonful of Peter Mueller's Cod-Liver Oil; and swallow as rapidly as possible.)

Kemmiche's Pepton is also said to be valuable.

Alcohol

Alcohol, although it is now known to be a food and often of great service in selected cases, need not be mentioned in detail, simply because I consider it in the light of a double-edged tool whose use can be safely directed only by a physician in each individual case. Fully sixty per cent. of my curable cases do better without alcohol in any form (my prac-

tice being in Colorado, in a dry climate at an altitude of 6000 feet).

One half pint of beef tea ; one half pint of thin sago ; one gill of cream ; the yolk of one egg.

Concentrated Food

Mix the beef tea and sago together while hot ; beat the cream and yolk of egg together, and then stir them into the hot beef-tea-and-sago mixture. Boil the whole for three minutes ; then strain and add salt to taste. To make the beef tea, cut up one pound of beef, out of the round, into small pieces. Put the meat into a double boiler with half a pint of cold water. Let it simmer for seven hours, and then strain. The sago is prepared by putting one and one half tablespoonfuls of sago into half a pint of boiling water.

CHAPTER VI

CLOTHING

THE clothing will have to be varied to meet the seasons, age, sex, and condition of the patient; also the climatic conditions under which the patient lives would serve to make a set rule in respect to what he should wear seem ridiculous. Caution is necessary in advising a pulmonary invalid how to dress, as they are often very poor judges in regard to their actual needs in this respect. The consumptive often feels chilly in the morning and warm later in the day, quite irrespective of the actual temperature.

For Men

Men who are taking the outdoor cure in temperate climates, during the winter should aim to have the clothing as light and also as warm as possible. The best way to accomplish this is to have heavy woollen underclothes and socks, an abdominal band of wool, a flannel shirt and sweater, a warm, woollen, double-breasted business suit, felt shoes, or, in a climate where snow lies on the ground much of

the time, Dutch socks or heavy woollen socks and arctics. Dressed in this way, with a fur coat and rug, the patient can sit outdoors in a sheltered place in very cold weather, and run no risk from exposure. The clothing may seem excessive, but a life of inaction at freezing temperatures, especially when encountered with lowered vitality, necessitates special precautions, such as I have mentioned. Underclothing must be changed much more frequently than in health, because certain poisons are eliminated in the perspiration when the lungs are diseased.

For Women

The clothing for women presents peculiar difficulties; the deep-rooted aversion most women have to being properly clad being one of them, and their desire to have clothes close-fitting, another. As is the case with men, the underclothes should be of wool, but, if this is found too irritating, silk or linen mesh can be worn under the wool. Stockings ought also to be of wool, unless thick shoes and leggings are worn. The clothing must, on no account, constrict the chest. A Jenness Miller or Equipoise waist, golfing skirt, thick shoes, leggings, and a fur cloak make a sensible costume for the outdoor cure in cold weather.

The night clothes, for both sexes, must be of flannel, with a warm wrapper and woollen slippers at hand, as the room will be fresh, and probably cold, towards morning.

Night Clothes

For sleeping outdoors on a sheltered porch in winter, where at times the thermometer goes below zero, special precautions are necessary. In a dry climate, like that of Colorado, the following method has been found to work satisfactorily for a delicate woman. The piazza is sheltered on three sides by the house walls, as is also the top or roof. No artificial heating is used. Curtains are drawn over the open side at night. The bed is an ordinary iron one, with woven-wire springs, upon which is placed a moderately thick hair mattress, and on this a wool mattress (four to five inches thick). The bedclothes consist of two blankets and sheets and a down quilt. These are, of course, well tucked in all around by an attendant the last thing at night. A hot-water bag, wrapped in several thicknesses of flannel, so as to give off heat very slowly, is placed in one corner of the bed at the foot. One pillow is placed under the head and the other on

Night-Dress for Women

Clothing for Sleeping Outdoors in Winter

any one rule that should be generally applied in the treatment of tuberculosis, it is that, when any degree of fever is present, the course of the disease will be injuriously affected in direct proportion to the amount of active exercise the patient is allowed to take. Still further, I constantly see an apparently quiescent and arrested process fanned into renewed and often uncontrollable activity by one single over-exertion.

This position in regard to exercise may seem rather an ultra one, but it has been amply sustained by abundant and unfortunate experience in this direction. What is but moderate exercise for a man in health means over-exertion and exhaustion to the phthisical invalid. To see a man with a daily afternoon temperature of 101° to 102°, and a pulse above one hundred, trying to gain strength by rowing a boat, riding a bicycle, or climbing a mountain, as he is often advised to do, and to note the baneful effect of this course on his disease, will prove more convincing than any form of argument. Absolute rest, so long as it is taken in the open air, is the best measure at our command to reduce the pyrexia of tuberculosis and to conserve the patient's energies, and should be persisted in for some time after the afternoon fever has ceased to be present, moderate exercise again being allowed only with caution.[1]

Massage

Beginning with massage, or passive exercise, we have a method not open to the same objections; as, even with greatly impaired vitality, massage is often most beneficial, conducing to increased nutrition, while at

[1] E. L. Trudeau, M.D., *Adirondack Cottage Sanitarium for the Treatment of Pulmonary Tuberculosis*, 1899.

the same time acting as a sedative and producing sleep. And the effect upon the superficial skin and muscles, by increasing circulation in them, tends, no doubt, in a great number of cases, to relieve congestion in internal organs like the lungs.

This form of exercise, in common with all exercise taken during the course of a disease like consumption, has its dangers, and should be used only by the advice of a physician and applied, if possible, by one trained in its use. If a consumptive is made irritable and sleepless by such treatment, modified massage, lasting not more than ten minutes, may succeed.

Dangers

The following directions for applying this treatment are excellent[1]:

Directions for Massage Treatment

The hands need to be at once strong and soft, the motions smooth and even, never jerky. The work should be done from the wrists, not from the shoulders, and you want equal flexibility and freedom of action in both hands. All movements should be begun slowly and gently, and their force and frequency gradually increased. A very tender spot can be barely touched at first, but, after a little skilful hand-

Hands

[1] Clara S. Weeks, *Text-book of Nursing*, D. Appleton & Co., New York, 1890.

ling, an amount of force can be employed which would have seemed incredible. The whole hand, not merely the ends of the fingers, should be used. In malaxation, or massage proper — manipulation of the deeper tissues,—the work is chiefly performed by the ball of the thumb and the palm of the hand. Each muscle is kneaded and rolled with carefully graded force. Begin at the extremities and work towards the trunk. If the feet are cold, keep at them until they are quite warm before going on. Take up each group of muscles systematically, compress, rotate and relax, advancing by degrees, that each handful may include part of what has been previously treated. Never stretch the tissues in opposite directions at the same time. Muscles should be stretched in the direction from their insertion to their origin, from extremities towards the trunk, on the back from the base of the skull downward, and away from the spinal column. On the chest, follow the pectoral muscles in the same way, and on the abdomen knead steadily and firmly the ascending, transverse, and descending colon. Massage of the abdomen often relieves dyspepsia and constipation.

Manipulation

Muscles

Friction should act only upon the skin. If counter-irritation is desired, a coarse towel or a brush is better than the hand. Friction may be vertical, transverse, or spiral. Rectilinear friction should be toward the centre of circulation, to assist the venous currents. Thus, on a limb, the heaviest strokes should be upward, the returning ones much lighter. Friction circularly, or at right angles to the long axis, though sometimes practised, is awkward and of little use. What may be done by such motions can be accomplished more effectively by vertical and spiral movements. In the latter, both hands are used at once—one ascending as the other descends. On the limbs, friction may be

Skin

applied at the rate of one to five hundred strokes per minute; on the body and thighs, the pressure must be greater, and the strokes longer, so that they cannot be as rapid. Malaxation and friction may be used in alternation. Take a small portion of the body at a time, as the space between one joint and another, and manipulate it thoroughly before passing to the next. With them may be combined also percussion over masses of muscle, and the various passive, assistive, and resistive motions.

Passive motions are conducted without any effort on the part of the patient. When there is partial control of the muscular action, the operator either helps or tries to hinder the efforts of the patient, being careful not to overtax his little strength, and the exercises are then known as assistive or resistive. Such movements are applied, together with massage, to strengthen weakened muscles and break up adhesions in diseased or ankylosed joints. It is of importance to know something of their anatomical structure and the limits of natural motion.

Passive, Assistive, Resistive Motions

In a few cases, benefit is derived by using oils which diminish friction and irritation of the skin. Cocoa butter, almond oil, etc.,[1] have been used;

[1] Europhen, teaspoonful; oil of rose, 2 drops; oil of anise, teaspoonful; olive oil, 5 teaspoonfuls,— has been of benefit when used on the chest in tuberculosis.

A wet pack applied to the chest for the night will often relieve night sweats. This can be done by immersing several thicknesses of linen cloth in water at blood heat, wringing out the cloths nearly dry, and applying them to the whole surface of the chest, front and back; over this bind a flannel in the form of a jacket, having it

lanoline probably is absorbed more easily than the others. Washing the skin with alcohol before rubbing increases the absorption.

Alcohol

When fever is excessive, aromatic vinegar, properly diluted, is grateful; and, for excessive night sweats, painting the skin with a sponge soaked in hot vinegar, into which a teaspoonful of cayenne pepper has been previously stirred, and allowing this solution to dry, especially on the legs, neck, and chest, I have found in my practice to be successful in a great number of cases, not only in arresting the night sweat, but in giving tone and strength. One must be careful to avoid any mucous surface,—a cut, scratch, or the surface of the eyes,—or the red pepper will sting and cause pain. Passive motion, or mechanical motion of the limbs, is the next step, and indeed it can be, and often is, made a part of regular massage, in such things as the Swedish movement.

Mechanical Motion

project at least two inches beyond the wet cloth all around. Straps of flannel can pass over the shoulders to prevent slipping, and the whole thing may be fastened together with safety-pins. When this pack is taken off in the morning, in a warm room, rub the chest with a towel to produce some redness of the skin, and remove all moisture before the clothing is put on.

Such exercise has also the advantage of a minimum amount of exertion and strain on heart and lungs, and a maximum effect on circulation.[1]

Respiratory Exercises

Respiratory exercises, such as blowing into a tube, taking long breaths, lowering of the air pressure by pneumatic methods, are no doubt of use in selected cases, but should *always* be given by a physician who knows the condition of the lung structure. Personally, I am of the opinion that such pulmonary exercises, when induced by the thin air caused by climatic change to an elevation of 2500 feet and upward, profoundly affect circulation and the composition of the blood, and, consequently, nutrition, and through nutrition aid in the arrest of tubercular extension; always remembering that these climatic changes are powerful and can work mischief if misdirected by the improper selection of cases — those, for instance, where too much lung tissue is invaded and the heart is weak and rapid.

Walking

Walking is probably the most frequently used form of exercise, not because it is the best, but because it is the one best understood and the one form of exercise that all

[1] Geo. H. Taylor, *Health by Exercise.*

patients have used; consequently, it is comparatively easy to advise and control. When the fever has abated, and the hot sun or the cold, stormy wind, as the case may be, is wisely avoided, it can be made an exercise of much benefit. The popular idea that increased chest expansion is not produced by the exercise of walking, but needs special exercise, is not true, as a decided increase of chest expansion follows from simply walking, even at a moderate pace, and along level ground at sea-level. Of course, a greater and more rapid increase of chest measurement will usually result from rapid walking, especially from walking on rough ground or among mountains at a considerable elevation.[1] It must also be remembered that increased muscular strength of the heart is quite as important, if not more so, than chest expansion, and that this is promoted by the simple exercise of walking. Few begin with sufficient care and attention to detail. The first day a slow walk of only a few moments is quite enough, and then, day by day, this can be increased; if a day comes when

[1] Prof. Zamssen, *Vital Capacity;* Morley, *Modification du Mouvements Respirations par l' Exercise Musculaire;* Mosso, *Life of Man in the High Alps*, p. 154.

there is fever, stop for a day or two. Do not walk at once after eating any solid food, and avoid walking when the stomach is empty—*i. e.*, just before meals. Do not walk too long without resting; give the heart a chance to rest also; and do not walk if it causes breathlessness. A good deal of exercise can be taken walking up and down on a piazza; although this is a trifle monotonous, the temptations to fatigue are more easily guarded against; the place is sheltered, the walking dry, and an opportunity to take rest or food is always at hand. Walking up or down hill varies the exercise and brings other muscles into play, but such exercise must be taken cautiously, and should not be taken at all unless the level walk has proved beneficial. In certain sanitaria abroad, paths are arranged with posts at specified distances, and walks are ordered to a certain spot and return, taking uphill at first so as to insure an easy return. In cases where there is a tendency to hemorrhage, a greater caution has to be observed, especially in winter. Several times I have seen hemorrhages from the lungs apparently induced by a walk in a temperature of 32° and

How to Begin Walking

Piazza as a Promenade

Up and Down Hill

then suddenly entering a house heated to 75° (I am speaking of an altitude of 6000 feet only). Even the Esquimau has a long entrance to his hut to insure an intermediate temperature; a pulmonary invalid should always spend a few minutes at least in a modified temperature, of say 50°, before coming from freezing temperature to a room at 75°. If moderate walks can be indulged in without fatigue and without undue elevation of pulse or temperature, then some work for the arms, chest, and back can be thought of; as most people are usually deficient in chest expansion, exercises directed towards overcoming this defect will be indicated, bearing in mind, of course, that they are not to be used until recovery is pretty well assured. A book which can be consulted in this matter is *Rational Home Gymnastics*, by Haelvig Nissen. He advises calisthenics, or exercises made by simple motions of the arms and trunk — all those special motions which tend to develop chest and back more than other parts of the trunk,—and gives a system by which they can be gradually increased day by day. The chief disadvantage, to my mind, in such automatic work is its lack of interest, and tendency to introduce a mental

Exercise for Arms and Chest

condition very much like that of a prisoner on a treadmill, and the want of inducement to outdoor exercise.[1]

Golfing

Golfing seems to fulfil the idea of moderate open-air exercise with interest for the mind to enjoy, so essential in treating all disease; and I have certainly seen arrested cases of lung tuberculosis that were more due to living in the open air, playing golf, than to climate or doctor. At the same time, the phthisical invalid also affected by that weird malady, "Golfites," needs to use much caution. If it happens to be an old golfer, the case is somewhat different, as then the strength will be expended in those graceful curves so accurately delivered that there is but little power expended and no jar or shock—skill taking the place of power. The novice, on the other hand, has quite a different task before him, and, especially if any part of the lung is solid or bound down by adhesion from old pleurisies, the awkward efforts toward the true St. Andrews swing

Danger of Golf

[1] *Healthy Exercise*, by Robert H. Green, M.D., is the latest and best book I know of on this subject; also see *How to Get Strong*, by Blackie—both published by Harper & Bros.

in driving are very apt to do harm to some part of the pulmonary apparatus. For such beginners, a preparatory course, directed towards a cotton ball in the yard of the home, is the best, only using a half swing (never having the driving-iron go above the shoulder), and, for a change, "putting"; if, at the end of a few days, no harm results (such as temperature, or pain in the chest, etc.), the green can be attempted, making no effort to go over the course, but confining the play to a few holes only, even if a consumptive friend boasts of going around twice. Have a sweater handy to put on after the playing is over; and, in addition, a milk punch is often quoted as beneficial.

Horseback Riding

This exercise, like the foregoing, depends largely upon the knowledge the patient possesses in regard to riding. If the patient has never ridden a horse, I should say he ought to ride some gentle old brute, and not go off a walk for a week or so, and not ride more than thirty minutes. At the end of that time he can decide, or rather his doctor can, as to the advisability of continuing. As to the exercise itself, for those in the first stages of the disease, who are capable of taking exercise to advantage

(*i. e.*, no fever or rapid heart action ensues within one hour after the exertion), and who are accomplished horsemen, or at least no novices in the art, I have found it to be by all means the most beneficial that can be taken. First of all, it insures open air, and, in a favorable climate such as every consumptive should live in, can be indulged in all the year round. The interest and occupation in controlling the horse, and sense of companionship, are of great moment. The exercise is largely transmitted force, first expended by the muscles of the horse; to a good rider there is but little actual exertion, while, as Dr. Holmes so aptly pointed out, the liver and other digestive organs are well shaken up, and their blood supply and activity increased, at a minimum expenditure of nerve and muscular force, which induces good digestion and, as a consequence, increased nutrition — a most important point in consumption. As to the varieties of seats and saddles, much difference of opinion exists; but, as Theodore Roosevelt has said, it is probable that the cowboy, with his straight leg, big saddle, and seat balance, has the best seat for his life; that the hunting seat, or the military combination of it with the cowboy

Saddles and Different Seats

seat, are both best adapted to the special wants of the respective riders, and leave little to choose. It is usually best to employ the kind that has been used before, or that the patient is familiar with.

Cycling

In this age at least, cycling seems to have supplanted walking, and to have become, to old and young alike, quite as well recognized as a means of locomotion. This is so universal a fact that the uses and abuses of the bicycle by invalids have become matters well worthy of our attention. Compared to horseback riding, cycling is not, in my opinion, anything like as beneficial to a pulmonary invalid. In the first place it is too uncertain an exercise; by that I mean that it is entirely too liable to suddenly become converted into violent exercise. Several factors may contribute to this effect: a high wind, or, for that matter, a comparatively moderate breeze, blowing against the cyclist, will immediately convert what was a pleasure accompanied by very little muscular effort, into an exercise requiring really violent exertion. Deep sand, mud, or rough roads have a similar effect by virtue of their retarding effect. As is well known,

Uncertain

Obstacles

hills will increase very much the amount of force necessary to move a wheel.

Of course, these obstacles may often be avoided, but there are times when it is impossible, as, for instance, when one has ridden a considerable distance and when about to return home finds that a strong head wind has risen, making the whole return trip a hard struggle. A pulmonary invalid, even if comparatively well, should beware of these dangers attendant on bicycle riding, as they are most real dangers to one who is enfeebled in heart or lung power. It is now well known that cycling causes a very sudden increase or pressure or tension on the blood-vessels, and thereby may be an exciting cause of pulmonary hemorrhages. The general attitude assumed by many cyclists is also distinctly injurious, the chest being cramped and the shoulders bowed over. If the handle-bars are properly elevated (say three inches above the level of the saddle), and rather wide apart, if a wheel with a low gear is ridden, and a pace of five miles an hour is adhered to, with proper precautions regarding winds, hills, and rough roads, a pulmonary invalid, who is in a condition to take

Precautions

Heart Action

Posture

moderate exercise, can often obtain benefit from riding a wheel, and I have seen decided improvement, in certain cases which were properly guarded, result from this exercise.

Bowling, etc.

As for bowling, billiards, or any other game indoors, the disadvantage is the confinement. Skating and tobogganing are to be preferred. Tennis is too severe for the average invalid. Rowing ought to lead to good results. Driving is a form of exercise of some value, especially as it insures outdoor air.

The Social Life and Amusements of the Pulmonary Invalid

The evil effects of "going out"—dining, theatre going, calling, etc.—upon the pulmonary invalid cannot be settled at once and off-hand by stating that all such amusements must be tabooed; because the diversion of mind which a certain class of invalids derive from so doing will often more than compensate for the dangers incurred. To enforce a rigid rule of seclusion will, in the case of such an invalid, produce such worry and restlessness as to seriously interfere with sleep and digestion.

But the invalid who has a decided chance of recovery, who has some fever every afternoon, whose trouble is comparatively recent, and in

whose case the fight for recovery will not extend over more than one year,—such a person should by all means give up all social life that makes any demand upon the vital forces. I have spoken elsewhere of how necessary it is that he should constantly breathe the purest air, that ten to twelve hours should be spent in bed every night, and that only the most digestible and nutritious foods should be taken: these are rules that ill accord with most of the conditions of polite society.

Dining out

Dining out seems like a most reasonable form of recreation, quite innocent and free from danger, but for either man or woman it means a change to thinner clothing at night when the temperature is lowest. The food which is usually served is not adapted to the wants of an invalid, and is frequently decidedly indigestible and of little or no nutritive value. One has very little opportunity to modify or change the air of a friend's house; many dining-rooms are hot and uncomfortable in cold weather, and would seem quite stuffy to one who is outdoors most of the time. Besides all this, the hour is often late and the return home difficult and often dangerous on account of the exposure to

cold and damp resulting from coming suddenly from a hot room into the open air.

Public Gatherings

The theatre, or, for that matter, any place where people are crowded together for some time, presents decided dangers from draughts, overheating, etc., and the chance of being infected by germs that are floating in the air.

Dancing

Dancing is too violent an exercise ; dust and bad air are here also dangerous enemies which should be avoided by the pulmonary invalid.

In short, nothing should be done that in any way lessens the vital force, either from fatigue, excitement, or breathing the air of a badly ventilated or improperly warmed room. All amusements that tend to break down the rules of good hygiene should be avoided. One of these infringements would be to play poker far into the wee, small hours, in a hot, smoky atmosphere, eating cheese, sandwiches, etc.

Colds

In considering social life and amusements the pulmonary invalid is usually under the impression that the one and only danger to be avoided is catching cold ; all else seems of small moment. No matter what is

done, it is all right so long as no "cold" is evident the next day. Now, this is a decided mistake; I do not at all advocate catching cold, but the fear of a breath of air,—wrapping up the throat and producing perspiration by wearing too many clothes, keeping the room warm and fearing to go outdoors,—these are the very measures to produce the dreaded cold. I have many times seen a whole household every member of which was down with a cold in the head, while the pulmonary invalid who, in accordance with my direction, was spending day and night in the open air, was perfectly free from the trouble. Bad air, hot rooms, and improper food and clothing more often produce a cold than exposure to the open air; the so-called coddling of the invalid is radically wrong.

Bathing

Warm Water

Cold Water

If the room is warm, the patient may take a sponge bath with water at 70° F. A little salt should be put in the water. After the bath take a brisk rub. As to cooler baths, — shower, plunge, etc., — the advice of a physician should be sought before experimenting with them, for it is possible to receive great injury by their improper use.

There is no doubt that hydropathy, when properly applied, is a curative agent of much power, which is often effective in cases of greatly depressed vitality, but I have found that the ordinary pulmonary invalid (especially if he is a sensitive American [1]), derives but doubtful advantage from the radical plunges and cold showers so much advocated in certain European sanitaria. Possibly this is due to the fact that I have had no opportunity of testing their measures in a properly equipped hydropathic establishment; but, as far as my experience has gone, no certain benefit has resulted from these measures unless the invalid was well on the road to recovery and health.

Hydropathy

[1] See *American Nervousness*, by Beard, page 54; and also *Neurasthenia*, by Savill, page 92.

CHAPTER VIII

AN INVALID'S DAY

IN order to give a clearer idea of the invalid's day in detail, or to show how a pulmonary invalid, who is applying the sanitarium methods at home, spends the twenty-four hours,—as regards air, light, food, exercise, and rest,—the following outline will be useful as a suggestion to work from, even though it may be greatly modified to suit individual cases. Let us take, as an example, a consumptive of the type most commonly seen, —that is, a man or woman, between twenty and thirty years of age, who has been broken down, let us say, by business or study in some city, and has been advised by his physicians to seek a more suitable climate. In this climate, at some health resort, but not in any sanitarium, he decides to devote all his time to regaining his lost health, no matter how irksome it may be for the time being. He has been ill but a short time (perhaps in all six months); only one of his lungs is affected, and that merely in the upper part; he

coughs in the morning and several times during the day, and perhaps at night, but he is not short of breath, and his pulse does not beat over one hundred times per minute when he remains quiet; his temperature is a little below normal in the morning before breakfast, but about three or four in the afternoon it rises to 101°. He has a good digestion, and has been an active, strong man before being taken ill, and since breaking down he has lost, we will say, ten or fifteen pounds of flesh. Although such a case is typical and frequently encountered, no one is exactly like another. However, the following directions will do for almost any one of this type.

On Waking

On waking in the morning the mouth should be thoroughly washed out with listerine or some antiseptic tooth-wash. Then sip slowly a cup of hot milk with a pinch of salt or a teaspoonful of lime-water stirred into it; but the milk must be taken very slowly, *i. e.*, fifteen minutes at least should be the time required.

Rub Down

In half an hour after this, the room having been warmed to a temperature of 70°, the invalid can be rubbed down with a flesh-brush; or, with the feet immersed in water at a temperature of 90°, the body can be

lightly sponged off with water at 70°, the water containing salt in the proportion of one tablespoonful per quart; this sponging should be followed by a brisk rubbing. (If the invalid is sleeping out-of-doors, the room can be prepared as indicated for this bath and dressing.)

Breakfast

Breakfast may consist of the following articles, care being taken that the food is cooked and served intelligently, often a difficult matter except under favorable conditions: Orange juice or grapes; cereal cooked four hours, taken with cream; either rare-broiled steak, chops, soft-boiled eggs, tripe, bacon, or sardines; toast and butter; coffee made with equal parts of hot milk, cocoa, or weak tea.

Exercise

For half an hour after breakfast the patient should rest on a steamer-chair out-of-doors in a sheltered place, such as I have described elsewhere. Then walk slowly a measured distance, resting, if possible, in the middle of the walk. The distance covered may be at first about one hundred yards and return, increasing it a little (ten yards) every morning. Have the clothes loose about the chest and take a deep breath occasionally. Of course driving, or being driven, may serve to fill in some hours,

if it is taken at the proper time of day and suitable wraps are provided to avoid chilling the body.

After exercising return to the chair and rest until 10.30 or 11.30, when a lunch may be taken consisting of: either half a pint of milk, or milk punch; kumyss, beef juice, raw egg with lemon juice; somatose biscuits; eggs beaten up with a little coffee.

10.30 or 11.30 A.M.

There is now a long interval until one o'clock which may be filled up with some reading, being careful of the light if outdoors, as it is more of a strain on the eyes than indoor light; flat-ground smoked glasses will often prove beneficial; if there is snow on the ground the reflection is apt to be very annoying to the eyes.

Occupations

Never sit quiet for more than one hour at a time. Walk up and down for three or four minutes at intervals in order to keep the blood circulating. If there is any inclination, a little tinkering with tools, wood-carving, drawing, printing photographic negatives, or even fancy cord work is a diversion, and serves to pass away the time, if not pursued long enough to tire the patient. Such work can be done while sitting in

a chair, with the aid of a table, if the weather is mild enough so that the hands do not suffer. A stamp collection offers amusement, as do some games of cards, etc.

Lunch or Dinner

Roast beef, steak, mutton, sweetbreads, scraped meat balls, chicken (broiled); baked potatoes, rice; milk, coffee, buttermilk, kumyss; Scotch broth, oysters (stewed or raw); stale bread or toast; light pudding or stewed fruit—nothing canned.

Afternoon

This meal should be followed by a rest of one hour out-of-doors; then take another short walk, moving slowly, and not being overburdened with wraps in winter, and taking care to keep out of the direct heat of the sun in summer. The walk should be followed by another rest, and if the temperature is now beginning to come up, absolute rest is desirable. At times the patient may have to go to his room and practically undress and lie on the bed. The windows should be kept wide open, however, and in case the temperature goes above 101°, mental as well as physical quiet should be insisted on; don't see people who excite you, and sleep if possible.

This meal should consist of either raw meat

sandwiches, meat juice, milk, clam broth, milk thickened with tropon, Imperial Granum, or Mellin's Food ; milk punch, egg-nogg, or milk thickened with Revalenta Arabica.

4 P.M.

Reading may be done to some extent, being careful not to tire the eyes or excite the brain. If the fever does not go above 99° or 99½°, the patient may remain on the piazza until dinner time,—at 6 or 7 P.M.,—putting on much heavier wraps, of course, at sunset, as in most climates the change of temperature is very sudden at this time.

This meal is very much like the lunch : roast meats, plain soups, squab, chicken ; asparagus, spinach, plain salad; light wine, stout, or whiskey and water ; stewed fruits or light puddings.

Supper or Dinner

The evening ought to be spent out-of-doors if possible. The facilities which we now have for such a life,—electric lights to read by, metal screens to keep out insects during the summer, means of warming the body by artificial heat,—all these leave no excuse, to people of moderate means at least, for not utilizing those precious hours which, in any climate at all desirable for the consumptive, can be spent out-

Evening

doors in the evening as well as in the daytime, and thus avoiding that foolish and suicidal habit of spending three or four hours every evening in a hot, stuffy room, with other people breathing the air, and, often, lamps using up the supply of life-giving, pure air. If it is not possible for the invalid to remain outdoors during the evening, however, see that he is not forced, like a fish out of water, to breathe bad air after having the fresh, outdoor air all day ; open the windows wide, and have electric lights if possible. Have an open fire going, but look out for draughts, and do not let the temperature of the room go above 68° F.

A lunch of malted milk or matzoon, milk punch, malted milk tablets, tropon in soup.

Bedtime

Avoid duck, geese, pork, fried foods, pastry, confectionery, carrots, cabbage, hot bread, beans, dried or salt meats.

Rest one half hour before and after meals.

With a temperature over 100°, take only semi-solid foods and no exercise at all ; always eat slowly.

The sleeping hours are very important to the invalid. Twelve hours must be spent in bed; the room must always be absolutely pure and fresh,

with plenty of outdoor air coming in. If this air is too cold, have more heat, and put more covers on the bed; if necessary a hot-water bottle may be put in the bed and a down quilt added to the other covers. On no account allow the windows to be shut; if it is at all possible, the patient should sleep outdoors, following the directions I have elsewhere outlined.

Sleeping Hours

Of course it is understood that as the invalid improves, ceases to have high temperature, and puts on weight, the above directions can then be much extended. The number of meals may be reduced to three; the diet can be much more varied. Driving, golf, etc., may be made to fill up the time spent outdoors in a far more agreeable manner, and the invalid by slow and careful advance may return to the habits and ways of well people, at last taking up again his former occupation or work in life.

I append to this chapter the following notes from *The Treatment of Pulmonary Consumption*, by Harris & Beale (Philadelphia, 1895), giving some idea of the treatment at a German sanitarium:

In addition to the Institutions for the Open-Air Treatment of Phthisis founded by Dr. Brehmer at Goerbers-

dorf and by Dr. Dettweiler at Falkenstein in the Taunus near Frankfurt, a similar sanitarium has been established upon the same lines at Nordach in the Black Forest (nearest station, Zell, Schwartzwaldbahn), in which the same rigid rules in the treatment of the patients are enforced as in the original institutions. The following notes have been taken from the careful description furnished us by Dr. Rowland Thurman, who has undergone the treatment himself at Nordach with great benefit. As regards the situation and climate of the locality he says: "The climate is very similar to our own, variable with frequent spells of rain—in fact to many who are familiar with the spot, the English Lake district is inevitably suggested. There is in summer a large proportion of sunshine, but the spring and autumn are usually wet." He goes on to say: "The treatment as I saw it carried out in my own person might be thus summed up: Rest, Extraordinary Over-feeding, and a Life in the Open Air."

Location of Sanitarium

The sanitarium is built at the end of a remote valley in the Black Forest, with a view to obtaining mental quietude. The nearest railway is ten miles away, and the nearest town of any size lies fifteen miles over the hills. The valley is small and densely surrounded with enormous pine trees, and there are innumerable watercourses descending the hillsides in all directions, so that the climate may be described as damp. The situation was deliberately chosen on account of its freedom from dust rather than for the presence of pine trees; in the height of summer it is very rare to see any dust clouds blown along the roads. The absence of coughing so obtained is an obvious and important advantage, and the short, constant cough occurring in a dry, high atmosphere is relieved in the somewhat damp, dust-free air, and in my own case was conducive to sleep at night and absence of

Damp Climate

Absence of Dust

pains in the chest by day. The sanitarium lies about 1300 feet above the sea level and is built on the slope of a hill facing south-west, protected from the north by the dense pine woods.

Construction of Houses

The houses are built of wood, or are of stone and wood-lined in all the rooms, with polished wood floors. No wall papers or carpets are allowed, being regarded as possible collectors of dirt, dust, and bacilli; so that the floors are sponged over every morning, and after the departure or death of a patient the walls are washed and revarnished. The rooms are heated by hot-water pipes and lighted by the electric light. There is no attempt to provide more than ordinary comfort. There is an air of extreme simplicity in the whole institution, which is peculiarly restful and soothing. I mention this only because it is a deliberately studied effort, carefully worked out by the medical man in charge of the sanitarium.

Care of Rooms

Heat and Light

Windows

The window space in each bedroom is very large, practically half one side of the room, and the windows are never shut. The dining-room, which is a minute's walk from the sanitarium, is enclosed by a roof and the end walls only; the long sides are open to the weather all the summer and the rest of the year are only partially glazed in.

Fresh Air

So it is not difficult to see that everywhere and at every moment a patient is breathing fresh air, uncontaminated by any large town and the respired gases of a fellow patient. This régime is a little trying at first, and often is met with opposition from the friends or from the patient himself. Relations and their visits are discouraged, and most patients are sufficiently impressed with the system not to offer much objection.

At first one feels cold, and, if the weather is wet, extremely uncomfortable; any number of rugs and wraps

are allowed, but the windows must not be closed. The whole life of the patient is guided by his temperature chart, which he is allowed to keep himself. I may add that all patients take their own temperatures in the rectum. This is done four times a day, at 7 A.M., at 12, at 6, and at bedtime; a temperature of 36.4° C. is a good morning measurement; if there is no fever, and after mild exercise in the middle of the day, 37.8° C.; if it rises above 38° C. patients must remain resting on their couches until seen by the doctor. At first the treatment is confined to almost complete rest on a wicker couch in the open air all day and removal to bed at six. If the weather is bad—cold and wet—the same goes on, but extra warm clothing is supplied. And all night, even in the cold frost, the windows are open.

Daily Treatment

Temperature

All this while special dieting is prescribed. Though no exercise is taken, the diet is roughly as follows (the maximum is not insisted on for the first few days):

Diet

Half litre of milk, coffee and rolls, eggs and meat as the patient likes. This is the only meal at which one can suit one's inclinations.

Breakfast

Half litre of milk. First course about half pound of beef or fish; second course about half pound of veal, mutton, or poultry; as much vegetables as can be crowded into the two platefuls; half pound of bread; half pound of pudding, rice, batter, custard, or ice-cream.

Dinner at 1.15

Same in quantity as dinner, without pudding, and the courses are varied as much as possible.

Supper at 7

These two meals have to be taken under the eye of the doctor, and no servant is allowed to remove a plate until quite empty. Alcohol is allowed (as beer or wine), but it is preferred to use it as a reserve food in case of exhaustion.

The results of all this feeding are various. The temperature seems absolutely unaffected. The digestion seems to rebel much less than would be supposed. Patients occasionally vomit in the middle of a meal. They are made to come back to the table and begin the meal all over again.

Results

Now I may point out the most striking results of the over-feeding. The patient's weight goes up by two, three, or four pounds per week. It is no unusual thing to find a patient gain five pounds the first week, and after one month two every week. All efforts are made to increase weight and make the patient as fat as possible. They are weighed once a week.

Temperature and weight being satisfactory, the exercise is begun very much on the plan of v. Oertel's heart-treatment. In cases where the temperature is not running high, the walking is allowed from the beginning. The hillsides are cut out in a series of innumerable footpaths, all having a gentle incline. At the morning visit, while the patient is yet in bed, he is told how far he may walk, which is generally for the first week not more than four hundred or five hundred yards. Two hours is the time for accomplishing that journey, and about an hour for the return, the pace being absolutely as slow as possible. One foot is slowly swung in front of the other, so that the least possible strain is thrown on heart and lungs. The benefit felt by the patient is that dyspnœa decreases, deeper breaths can be taken, and palpitation disappears. This arrives mostly by the direct improvement in the heart and circulation, also by the careful lung-gymnastic that such slow walking causes. Each morning, in spite of the weather, this prescribed walk is taken, for by this time the patient is no longer timid with regard to getting wet. In fact, as a rule, the benefit as shown in increased freedom of breathing is so marked that no patient is

Exercise

Walking

anxious to remain indoors, or to forego the slow, fatigueless exercise. Any accompanying heart disease is certainly benefited by this exercise. One important point I have not yet mentioned, that is, the expectoration and the disposal of it. Each patient is very particularly instructed never to swallow it, and on pain of not being allowed to remain at the sanitarium he is warned never to spit anywhere except into one of the receptacles provided for him. These are two. By the bedside is a spitting-pot bearing the number of his bedroom, and in his pocket he carries a stout glass spitting-cup, invented by Dettweiler of Falkenstein, which is emptied for him by the servant, and washed out with liquor potassæ. All sputum is emptied into the drains. It is found to be almost always useless to apply any antiseptic solution to it.

Sputa

To recapitulate. Mental and bodily rest, tempered with an amount of regulated exercise, over-feeding of a fearless and heroic description, and perpetual fresh air—these are the means taken to combat the disease. The increased ease of respiration, the gain in the weight, and the measurement of the thermometer are the indications of improvement taking place, the measurement of the latter being the important guide in regulating the amount of exercise. The quantity of fresh air is always absolute, and the feeding in large quantity is continued to the end. For the last few months milk is taken off from the diet. And that the desired end is approaching is shown both by the above mentioned improvements and by the disappearance of bacilli. Careful monthly examinations are made by the usual methods, and the cure is kept up until ten or fifteen preparations have shown no bacilli, and then, as a final proof, a rabbit is inoculated from the patient's expectoration, and three or four weeks are allowed to elapse to see if the animal will develop tubercular enlargement of glands and die.

CHAPTER IX

PSYCHOLOGY OF THE SICK-ROOM AND TREATMENT OF EMERGENCIES

THE mental atmosphere which surrounds the pulmonary invalid, such as the companionship and society of his daily life, is much more important to his welfare than is generally understood. While it is true that, even as noticed by Arytacus before the beginning of the Christian era, the consumptive is generally cheerful and optimistic to a remarkable degree, continuing so when the disease has advanced to the last stages and recovery is quite impossible, yet there are many individuals, whose disease has been brought on by close application and over-ambition, whose nervous system is irritable and sensitive. Such people have often a morbid dread of being considered invalids; they are worried and impatient over trifles, and bitterly resent the apparently unkind fate which has interfered with their life-work. Such cases will tax all the resources of the caretaker, and only by a firm and constantly exercised tact and unusual patience

can success be attained, or the best hygienic welfare of the patient be secured.

Too much Care

It is often very pathetic to see the well-meant, but ignorant and awkward efforts of the family nurse in taking care of a nervous consumptive. A mother in her care of a son, urged on by love and a constantly wearing anxiety for his comfort and recovery, will, in season and out, persistently wrap up, admonish, direct, and fuss until her very presence becomes little short of torture to a sensitive boy ; and on his showing a natural impatience at being worried so much over trifles, he will probably be met by reproaches : of how it is all done for his good, that she is willing to give her life for him, and that her efforts are thrown away. Such a condition of affairs is bad for an invalid, and can in many cases be avoided if the routine is first laid out and written down by the doctor, in order to be referred to on occasion, or when there is a difference of opinion. It is often best to call in a trained nurse at once in such a case, and thus avoid friction.

The caretaker must remember that nagging in all or any of its phases is quite as detrimental to the invalid's progress as almost any imprudences

or sins of omission can be; and I feel assured that many doctors will agree with me in the opinion that the pulse and temperature are as frequently increased and elevated by "nagging," or a small family row, as by overlooking an extra wrap or a glass of milk. For the pulmonary invalid who is confined to his room and in bed, the case is even worse, as there is no escape, and thus the presence of people who are continually "rubbing" the invalid the "wrong way" has more effect. They must be excluded from the room, even if they are the nearest and dearest. Dr. Oliver Wendell Holmes has, with his characteristically crisp and clever words, so expressed my meaning in his *Professor at the Breakfast Table*, that I cannot refrain from quoting him:

Nagging

> Be very careful how you trust one of these keys of the side door. The fact of possessing one renders those even who are dear to you very terrible at times. You can keep the world out of your front door or receive visitors only when you are ready for them, but those of your own flesh and blood, and of certain grades of intimacy, can come in at the side door, if they will, at any hour and in any mood. Some of them have a scale of your whole nervous system, can play all the gamut of your sensibilities in semi-tones, touching the naked nerve-pulps as a pianist strikes keys of his instrument.

How often have we seen the above verified in the sick-room! How often do we see the poor invalid writhe under the well-meant officiousness of some "terror of the sick-room," who will introduce friends to cheer you up when fever is high and sleep about won over; if the windows are open they shut them with a crash, or *vice versa*. They have a cheerful way of referring to all relatives of the invalid who have died of consumption, and whose symptoms at a similar stage were much the same, fairly revelling in the details of the case; or, perhaps on some other occasion, they insist on a trial of some wonderful remedy that has, to their certain knowledge, cured the worst cases.

Unfortunately, such a picture is not overdrawn, and even in this enlightened age a consumptive can often say with all sincerity, "Protect me from my friends."

The cheerful caretaker, one who forgets self, who is quick and yet avoids all friction, who is firm, patient, always having the steel hand well gloved in soft velvet, whose very presence is a wholesome tonic, and every word and act an unconscious, hypnotic suggestion of health,—such people are "born and not made," and when

found in the howling wilderness of the unfit should be prized as above price.

Emergencies

The treatment of what may be called emergencies in the life of the pulmonary invalid should be left at once to the care of the attending physician, who should always be sent for without loss of time; but it is also important for the nurse or caretaker to know some simple methods of treatment, which can be used in the interval before the doctor arrives. Such simple methods are not only valuable in themselves, but reassure the nervous patient and give a sense of security, inasmuch as they see that something is being done for their speedy relief.

Hemorrhage

Probably the most dreaded occurrence in the life of a consumptive is an attack of pulmonary hemorrhage, or bleeding from the lungs. The suddenness of its occurrence—often without warning, and frequently at times when the invalid is feeling better than usual,—the sense of suffocation, and the sight of the blood, combined with a knowledge of its possible danger,—all arouse even in the most stout-hearted and phlegmatic individuals a

lively sense of alarm and more or less nervous shock.

The first thing therefore for the attendant to do is to reassure the patient. Keep cool and do not hurry; you can in this way prevent excitement and keep the pulse from beating so fast. It should be borne in mind that by far the greater number of hemorrhages from the lungs are not dangerous to life, but, on the contrary, probably relieve some congested part of the lung. One should also remember that what appears like a large quantity of blood scattered over handkerchiefs, towels, etc., or mixed with a quart or more of water in a white basin, is in reality a very small amount, if it could be collected into one vessel. Very often no more blood is lost in this way than when a tooth is extracted or in a case of "nose-bleed."

Ensuing Panic

The general panic that ensues sometimes when the invalid has lost a little blood is deplorable: often the whole house is in an uproar; doors bang, people are running up and down stairs, the sick-room is in great confusion, the poor patient is surrounded by a circle of anxious faces, the room is close and hot, and any remedy which chances to be suggested by

some bystander,—such as salt on the tongue, ergot,[1] etc., all of which are useless — will be immediately tried. The mental agitation, induced by the fuss, bustle, and alarm, is to the patient really much more injurious than being actually neglected.

Measures in Case of Coughing

However, the first thing to do for a consumptive when he begins to cough up blood is to send quietly for the doctor; keep every one out of the room who has no business there; cheer and reassure the patient by your calm manner; do not allow any talking, and keep the body half reclining, propping up the patient with two or three pillows. If it is summer, throw the windows wide open,

[1] In regard to my statement as to the uselessness of ergot, I will say that my experience has shown that it is practically of no value. I gave ergot for six or seven years, and have seen no difference now that I have not used it for several years. Good authorities, however, recommend its use. Yet it has been proved that ergot, if anything, increases the blood pressure in the lungs, as it causes the contraction of the other vessels of the body, while those of the lungs are not contracted, as they have no muscular coats. Dr. Babcock, *Trans. Am. Clim. Ass.*, quoted from Opendrowsky and Soudois.

Also from the *Journal of the Am. Med. Ass.*, March 10, 1900. *Dangerous Pulmonary Hemorrhage in Tuberculosis, and its Management*, Norman Bridge, M.D.

or if the weather is cold, have them opened enough to cool the room to 50° or even 40°, as cool air is useful. Now measures to stop the hemorrhage may be instituted. Give cracked ice to be dissolved in the mouth; if at hand, administer a dose of twenty drops of chlorodyne in a tablespoonful of cold water. Put a poultice of flaxseed three parts, and mustard one part,[1] on the body. (This should be put over the right side from two inches below the nipple to the end of the ribs, and from the spine to the middle of the body in front; put this poultice on warm.) The poultice may also be made of flour eight parts and mustard one part. Pond's Extract is also said to be of service if the chlorodyne is not at hand. If one is trained in the use of hypodermic injections, one quarter morphine under the skin and no medicine by the mouth is probably more effective than anything else. After the hemorrhage has stopped, if there is constipation, give a cathartic, such as calomel, one tenth grain, every half hour until ten are taken; fluid citrate of magnesia,

When the Hemorrhage Stops

[1] Told me by Dr. Jacob Reed of Colorado Springs, who found it useful. It probably acts by contracting the internal vessels, as found by Schneller's experience on animals.

half glass, may be given instead [unless the bowels have moved frequently (three times) during the previous twelve hours]. Keep the patient absolutely quiet; give only liquid nourishment, cool or cold, and no stimulants. It is well also to instruct the invalid to avoid coughing as far as possible, and not to speak at all.

Fever

A feverish state, due to some inflammation in the lungs, is generally felt during the course of even the mildest and most curable case of consumption. In the morning hours there are often periods of chilliness, while in the afternoon there is apt to be an elevation of the patient's temperature; the skin feels hot, the eyes often burn, and there may be some pain in the back or muscles, accompanied by drowsiness or languor.

To Lower the Fever

The best way to reduce the fever is to have an excess of outdoor air, and this may be obtained by having the patient rest lying outdoors. If the fever is very high, such as a temperature of over 102° or 103°, absolute rest must be insisted upon. The patient must be put to bed or lie on a sofa with loose clothing, being, if possible, outdoors, but if indoors, having the room cool and darkened. Only liquid food

should be taken, as digestion is apt to be poor at these feverish periods. If there is thirst, Vichy water, lemonade, or orangeade may be taken, or perhaps, if the patient prefers, cracked ice may be used. The skin can be sponged off; to do this sponge a small part of the body only at a time, and do that under the clothes in order to avoid chill, drying each part before proceeding to another. For this purpose use a small, soft sponge (from which most of the water has been wrung out, leaving it merely damp), with water at a temperature of 65° F., or water and alcohol equal parts, or water and vinegar, or water and sea-salt in the proportion of one tablespoonful to a pint of water; a small amount of cologne added to the water is more agreeable to some people. This sponging can be repeated every hour or so during the height of the fever, and discontinued when the fever goes down or the patient feels easier.

Foods

Sponging

The cold-air bath is of advantage if managed with care. The treatment is essentially as follows: the patient, covered only with a sheet, lies in a room with the temperature about 45°–55°. The patient's temperature must be very carefully watched so that additional

Cold-Air Bath

covers may be put on in case it goes down. The air bath must not be attempted in a damp climate; in dry mountain regions, with due caution regarding draughts, it is a valuable means of reducing high temperatures, without any danger if the proper precautions are observed.

Cough

Severe coughing, especially coming on in paroxysms during the night, is not an infrequent occurrence in cases of consumption, and, inasmuch as it tires the patient and causes loss of sleep, it should be relieved. The simple remedies are often of service; but, as a rule, all cough syrups and the like should be avoided, as they tend to upset the digestion and retard lung drainage. Often a cup of hot milk or beef tea will bring relief by dislodging mucus near the throat; inhaled steam, formed from water and oil of eucalyptus, or camphor, or pine tar, is also useful. Preparations containing menthol, used in an atomizer, or a mixture of twenty drops of spirits ammonia in a tablespoonful of water, or sometimes a swallow of whiskey, are all good on occasion. A small blister (the size of a quarter), placed on the chest on the side affected at about the third rib in the nipple line, has brought relief. The narcotics,

Remedies

such as opium, morphine, or preparations containing them, should be used only by the advice of the physician. Numerous lozenges are useful, or flaxseed or slippery-elm tea, taken slowly, is often very soothing.

Cough

If the cough comes from inflammation in the larynx and is very painful, swallowing being difficult, a little blister of cantharides, the size of a dime, on each side of the Adam's apple will relieve the suffering. In such a case the patient should take his food lying on the bed with the face hanging over the edge, and sipping the beverage through a tube. Sweating can often be avoided by waking the patient up, in cases of periodical attacks, before it occurs and giving him a cup of hot liquid food, rubbing the body with flannel, or sponging off carefully with vinegar and cayenne pepper or aromatic vinegar, taking the precaution not to expose more than one quarter of the body at a time and to have the room warm while the sponging is being done. A compress will effect the same result if it is skilfully applied; a cloth dipped in warm water and wrung out is placed around the chest from just under the armpits to the margin or lower border of the ribs. This is

Sweating

covered tightly with at least two thicknesses of flannel, which extends two or three inches beyond the wet cloth and is fastened with safety-pins so as to exclude the air. This bandage or compress may be removed in the morning and the skin rubbed dry with a flannel cloth.

Pain in the Side

Pain in the side is frequently complained of, and generally arises from pleurisy. A hot mustard plaster or simply mustard leaves, or a hot-water bottle, will be of service in lessening the pain if placed against the side. A strip of rubber plaster, drawn tightly around the painful side from the spine to the middle of the body in front under the nipple, lessens the movement and thereby relieves the pain.

Pain at the Back of Head

If the patient has persistent pain at the back of the head, which is accompanied by languor, with temperature above or below normal, rest should be insisted upon, as there may be some increase of the disease which is about to develop.

CHAPTER X

CARE OF THE CONSUMPTIVE'S CHILDREN

WHILE, as I have mentioned elsewhere, the actual germ of consumption is very rarely inherited directly from the consumptive mother or father by the child before birth,[1] there is often inherited a special susceptibility of the tissues, a want of power to resist the tubercular disease or consumption, that should make us unusually careful regarding all details of hygienic management in these cases, so that we may insure to such children a healthy maturity. Precautions in regard to certain matters should begin from birth.[2] If the father or mother is tubercular, strict care must be exercised in regard to all possible sources of infection, as I have explained under that chapter. That is, the consumptive

[1] *The Cause and Prevention of Phthisis*, Milroy Lectures, 1890, Ransome.

[2] Doubris has said: "If a woman threatened with phthisis marries, she may bear her first accouchement well; a second with difficulty; a third never." Osler, *Practice of Medicine*, page 247.

parent must on no account allow the children to be exposed to the dangers arising from sputa drying on the handkerchief, on the floor, or on the grass outdoors, because if thus exposed, the sputa becomes mingled with the dust and air of the room, and may consequently gain access to the throat or lungs of a child. This is especially true when children are at the age when they crawl about on the floor, gathering the dust, and putting everything they see into their mouths; they are thus far more apt to become infected than an adult who cannot be so directly exposed to this dust.[1] Then, too, children playing on the grass run a risk if this

Sources of Infection

[1] *Berliner klinische Wochenschrift*, Nov. 20, 1899, quoted in the *Phil. Medical Journal*, March 3, 1900. "Volland is of the opinion that tuberculosis, particularly that form known as scrofula, is not due to the inhalation of bacilli, but to the ingestion of the germs by way of the mouth. He believes that children crawling upon the floor, or playing in the dirt or sand, contaminate their hands with the bacilli, and that the latter are then carried to the mouth and produce the disease. Proper hygiene therefore, demands not only that tuberculous sputum should be destroyed, but also that children be prevented from coming in contact with the floors with their hands, or that the floors be kept scrupulously clean. Mothers and nurses must be instructed as to the danger of dirty hands in children."

grass has been infected by careless expectoration. A consumptive parent will also run great risk of infecting the child if he uses the same handkerchief for the child without having boiled and thoroughly washed it first.

Nursing

A consumptive mother should never be allowed to nurse her child. A wet nurse should be procured, or else artificial food used. Also, in feeding her child, the mother must be cautioned against using the same spoon, fork, or cup, as she would do in tasting the food before giving it to the baby, or from trying a rubber nipple to see if it will draw, etc., as her saliva may contain the germs of tuberculosis, and infection of the child with some form of tuberculosis may possibly result. Kissing children on the mouth is also a dangerous thing to do. Having the child sleep in the same room with a consumptive, or in the same bed, is running a decided risk, that should by all means be avoided.

Kissing

Milk

The milk given a susceptible child ought to be of the best and to be taken from a dairy where the cows are frequently inspected for tuberculosis. If there is any uncertainty about this fact, the milk should be boiled

or pasteurized. The following directions, from *Treatment of Consumption*,[1] pp. 82-86, are practical and sensible :

When the child reaches the age of six months, it is allowable to increase the food by the addition of small quantities of thoroughly well-ground oatmeal, or of such patent foods as Savory and Moore's, Mellin's, or the like, and at nine months to a year, varying somewhat according to circumstances, gravy from underdone mutton or beef, with bread-crumbs, may make the mid-day meal. At a year we strongly advise the administration of some underdone lean mutton or beef, pounded, chopped fine, or pulled to shreds by means of a couple of forks, and throughout the life of the child the amount of meat in the diet should be considerable.[2]

[1] Harris & Beale, Philadelphia, 1895.

[2] The following food tables, taken from J. P. Crozer Griffith's *The Care of the Baby* (Phila., 1899), may be useful, although they were not intended particularly for weak children. They are good guides to sensible feeding of the child, and in cases where the child has a tendency to scrofula, Russell's Emulsion of Mixed Fats can be added at stated intervals. It must be remembered that ignorant preparation and administration of food is frequently an important factor in producing tuberculosis.

"*Diet from One Year to Eighteen Months.*

From 12 to 18 Months

Breakfast (6 to 7 A.M.).—(1) A glass of milk with stale bread broken in it; (2) oatmeal, arrowroot, wheaten grits, hominy grits, etc., made into a porridge with milk and well cooked for two hours at least; (3) a soft-boiled or poached egg with bread broken in it, and a glass of milk.

Second Meal (10 A.M.).—A glass of milk.

Dinner (1.30 to 2 P.M.).—Bread moistened with dish gravy (no fat), beef tea or beef juice, a glass of milk; (2) rice or grits moistened in the same way; (3) a soft-boiled egg and stale bread thinly buttered. Rice sago, or tapioca pudding, or junket, in small quantities as dessert with any of these diets.

Fourth Meal (5 P.M.).—A glass of milk or some bread and milk.

Fifth Meal (9 to 10 P.M.).—A glass of milk.

Diet from Eighteen Months to Two Years.

Breakfast (7 A.M.).—(1) A glass of milk with a slice of bread and butter, or a soda, graham, oatmeal, or similar unsweetened biscuit; (2) a soft-boiled egg with bread and butter and a glass of milk; (3) porridge as described in previous list. **From 18 Months to 2 Years**

Second Meal (10 A.M.).—(1) Bread broken in milk; (2) bread and butter, or a soda or other biscuit with a glass of milk.

Dinner (2 P.M.).—(1) Boiled rice, or a baked potato mashed and moistened with dish gravy or beef juice, and a glass of milk; (2) mutton or chicken broth with barley or rice in it, or "beef food," bread and butter, and some sago or rice pudding made with milk; (3) a small portion of minced white meat of chicken, turkey, or fish, or minced rare roast beef, beefsteak, lamb, or mutton, some bread and butter, and a glass of milk.

Fourth Meal (5 P.M.).—(1) Bread and milk; (2) bread and butter and a glass of milk."

Well-boiled milk and bread, or porridge with plenty of milk, should be given for breakfast and supper, and at other periods of the day the child should be encouraged to take plenty of good milk. On the other hand,

pastry should not be allowed, as certain to tend to indigestion, and sweets only of the simplest kinds permitted. Fatty foods may be given if the child can take them; few object to bacon, but, as a rule, children at all inclined to be delicate cannot really digest meat fat, although they can take fat in milk, cream, butter, and cod-liver oil. We shall have more to say in a later chapter about cod-liver oil, but here we would advise small doses, viz., a teaspoonful each morning a quarter of an hour after breakfast and another after dinner, to a child showing the slightest tendency to debility or marasmus. We must recollect, however, that the susceptibility we have to deal with is something much more subtle than rickets, which is a disease essentially due to improper feeding.

Vegetable Foods, Milk, etc.

Next to proper feeding comes the importance of plenty of air and light. In this respect a child is like a plant: it cannot attain its full growth or development without air and light; and a tubercular child, or one potentially tubercular, requires them more than one more robust. Of course, the ideal condition for a child is to be brought up in the country, free from the smoky and murky atmosphere of a town, where the air is purer and the sun's light less obscured than elsewhere.

Air. Light

If, however, a country life is not practicable, care should be taken that a child has as much of open air as possible, and, when he gets a little older, anything in the nature of open-air games should be encouraged. Whenever opportunity occurs, it is well to take such children into the country, or to the sea-side, for a change of air, even if it be for a few days only. Special advantage should be taken of the summer or autumn holiday to encourage outdoor tastes and habits. At the sea-side, the vast majority of children obtain rapid and marked benefit. Paddling in

Holidays Vacations

sea-water with bare legs cannot be recommended, but regular bathing, and later on swimming, are by all means to be advocated, but watch must be kept to note the effects produced and to guard against incautious over-indulgence. Bathing in very cold water and staying too long in water at any temperature, especially on dull, chilly, or overcast days, are both apt to be followed by catarrhs, even to those in health, and still more frequently in the case of delicate children. So long as bathing is followed by a satisfactory "after-glow," very little harm is likely to follow, but if the child be found to be cold and shivering, such bathing should be promptly stopped.

Bathing

At the same time it should be recollected that such children are, as a rule, very apt to take "chills," which may seriously disturb the functions of the liver, so that warm clothing, with flannel or woollen garments next the skin, are a *sine qua non*.

Chills

As regards young children, it is a doubtful point as to whether they shall be taken out in cold, damp, windy weather. East and north winds, and north-east winds, frequently produce catarrhs and "chills," and caution is therefore necessary to avoid such complications. Warm gloves, woollen stockings, and good, well-made boots with stout soles should always be worn. Cold air is not, however, *per se*, a contra-indication to open-air exercise, and bright, sunny, frosty weather is, if proper precaution against catching cold be taken, decidedly beneficial.

Weather Clothing

Next as regards the rooms in which children live by day and night. They should be large, lofty, and light, should have preferably a south aspect or, possibly, a west, never a north situation. The day nursery should be thoroughly well ventilated every evening after the child has gone to bed, with well-opened windows, and with the fire kept in for a time.

Room

In the same way, the night nursery should be aired during the day, but the temperature should not be very different from the day room. On general sanitary principles, these nurseries should be well removed from water-closets and sinks.

If the child survive and continue healthy during early years, the same kind of precautions have to be taken in boyhood or girlhood, but regular exercise with light dumb-bells, ordinary drilling, and such games as skipping, playing at ball, and such like, are of importance, both in expanding the chest and developing the muscles. Later on, cricket, tennis, fives, rowing, and other outdoor games have the same good effect. It is unnecessary to specify the exact clothing to be worn by girls and boys; the only general principles which should be observed are, that the articles of dress should be warm, should be made chiefly of woollen materials, and should be as light as possible.

Exercises

Clothing

Again, one is asked as to boys who are potentially delicate, should they go to a boarding school, and later on to a public school? The reply which should be made, of course, depends upon circumstances; but, speaking generally, supposing it is possible to insure that in a boarding school a proper supervision is exercised as to health, and that the school itself is well built, well situated, at the sea-side or in the real country, one may reply in the affirmative. Day schools are not to be recommended, since the number of pupils is out of proportion to the room accommodation, and the consequence is that the rooms, in which so many hours are spent per diem, are stuffy and ill-ventilated. That such is the case any one may convince himself if he go into a Board School room, in the construction of which attention to ventilation and other sanitary requirements may be said to have been given, yet in such a room in a couple

Schools

of hours the atmosphere is dense and stuffy. Whether at school or at home, too many hours' continuous work per diem, and too long lessons, should be deprecated.

At last comes the question, supposing the school life has been passed through with success as far as health is concerned, as to the kind of occupation it is best to recommend, and this is one which can only be answered upon general principles, such as, that an open-air life is one to be preferred to one more sedentary, and that a country life is likely to maintain the health better than a town life.

Occupation

In the course of measles, whooping-cough, and influenza we have, in susceptible children, especial dangers, since, during the course of these diseases, a bronchitis is apt to leave some chronic injury likely to be followed by tuberculosis; therefore it is best to be more careful during their convalescence.

Measles, Grippe, etc.

All children or infants with inherited tendency to consumption, who sleep with the mouth open even when not suffering from a cold, who snore at night, and look listless and pale, with a stupid expression, and always having the mouth open and the nose stopped up, probably have some obstruction to breathing, this obstruction being far back in the nasal passages. Such cases must be seen by a throat specialist, as such interference with breathing induces bad nutrition. Also, if

the tonsils are enlarged, or there are lumps on the neck under the ears, or a swelling along one part of the spine, or lameness in one leg, with pain and sudden cries at night, the doctor should see the child as soon as possible.

Furnace Heat

The dry, irritating furnace heat, which is the only means of warming in many American houses, must be cautioned against. No room ought to have a temperature of over 68° F., and in many instances some evaporating arrangement, such as hanging a wet cloth before the radiator, is advisable. Exercise, but not to excess, should be taken, and there should always be plenty of ventilation. Over-expansion of the chest should be avoided, as this merely tends to a possible reaction when, at some time, a sedentary life is taken up. Exercises which strengthen the heart are to be preferred.

Exercises

Cycling

Cycling, which is now used to the exclusion of many other forms of exercise, is frequently a strain on the heart in the case of a delicate child. This exercise must be used with caution. Very rapid wheeling (as in racing), climbing steep hills, and taking long trips should be avoided. The handle-bars must

be placed well up and back to avoid the injurious and "round-back effect" so often seen in the young cycler.

The whole treatment by which susceptible persons are strengthened against the inroads of tubercular bacilli is thus summed up by Dr. Arthur Ransome[1]:

> These measures are nearly all comprehended under the one word "Hygiene." They may be briefly summed up under the heads of: residence in a healthy locality, situated, if possible, upon a dry and pure subsoil, elevated above the surrounding ground; abundance of nutritious, easily digested food, with a large allowance of fats; an almost entirely open-air life, with as much sunshine as can be obtained; suitable clothing, cleanliness, and bracing cold-water ablutions, innocent amusements, and exercise without fatigue.

[1] Arthur Ransome, M.D., F.R.S., *Researches on Tuberculosis*, London, 1898.

CHAPTER XI

COLORADO

Now we ought to be careful of the health of the inhabitants; and this will depend, first, on the situation and aspect of the place; secondly, on the use of good water, the care of which ought to be made a first object. For those things which we use most and oftenest have the greatest influence on health; and water and air are of this nature.

ARISTOTLE.

IN the following pages I have endeavored to the best of my ability to explain, in as clear and non-scientific a manner as possible, the methods to be employed and cautions to be observed by those pulmonary invalids who are seeking health in the high, dry plateaux near the Rocky Mountains. I have treated quite a number of invalids during my sixteen years in Colorado, and I have been more than once greatly surprised at the general ignorance displayed, by even the most intelligent and cultivated people, on the subject of climatic treatment, an ignorance which, alas, often defeats the most powerful and beneficial climatic influences. An observation by Dr. Rush, written in

Ignorance on the Subject of Climate

1793, on the value of climatic treatment, gives a pregnant example of this: "A change of climate must not be expected to produce its full effect in less than two years. A medical attendant must accompany the patient, if possible, to prevent his losing time in the pursuit of all sorts of remedies that will be recommended to him."

The State in Outline

Colorado's [1] area is over 100,000 square miles, nearly twice that of all New England. Of this region, the eastern part, one third of the entire State, is a rolling plain, the eastern border of which is 3500 feet, and the western, where it touches the foothills, 4000 to 6000 feet above sea-level.

Plains

The mountain system which covers the western two thirds of the State is too complex to admit of brief description. It is enough here to say that behind the high ramparts of the front range, four great parks or valleys or mountain basins stretch north and south across the State, with an elevation, as to their rolling or level floors, of from 7000 to 9000 feet, and that between these and the State's western boundary are many mountain ranges and isolated peaks rising out of the wide plateaux. In and out of this 60,000 square miles of mountain, park, and table-land flow the Arkansas, the Platte, the Dolores, the Grand, the Bear, and other rivers.

Mountains

[1] In the following description of Colorado, I have copied liberally from *Colorado: About its Climate*, edited in 1898 by J. C. Dana and Carroll E. Edson, M.D.; also from *The Colorado Springs Region as a Health Resort*, 1898, edited by Gilbert McClurg and myself. The facts stated can in my opinion be relied upon.—THE AUTHOR.

Along these rivers and their tributaries are thousands of miles of valleys, some of them narrow cañons and little more, many of them broad, fertile, and inviting. These valleys vary in elevation from 4000 feet to 8000 or 9000 feet.

Climate

Colorado climate is, of course, as varied in many of its aspects as is the surface of the State itself. On the mountain peaks, 14,000 feet above the sea, is perpetual snow, with scant Alpine vegetation peeping forth in summer beside the drifts. In the lower valleys the climate is almost semi-tropical, and here delicious peaches, grapes, and similar fruits are easily and profitably grown. Between these two extremes are found climates of all degrees of temperature. Places at the same altitude, moreover, in different parts of the State, varying as to the trend of the valleys in which they lie and as to their exposure to the winds, vary also, and widely, as to their temperature and their attractiveness as places of residence.

Weather

Three things common to all Colorado, however, must never be lost sight of—blue sky, sunshine, and dry air. All over the State it is true that, save in the highest altitudes—say above 7000 feet,—on most days in midwinter it is possible for one to sit in comfort in the sunshine in any sheltered nook. It is almost perpetual sunshine, which has perhaps more to do with the exhilarating effect of Colorado's climate on both well and sick than any other factor.

Why the Climate Makes Friends

The Coloradoan visits his old home in Iowa, or Ohio, or Pennsylvania, or New England, or in the South, for a few weeks and returns to his adopted home, and "Did you have a pleasant time?" is the first question that greets him. And over and over again comes the answer: "Oh, yes; except for the weather. It was so damp and oppressive—or cold and cloudy all the time."

The climate of America as a whole is brilliant and sunshiny, relatively to that of the world; but the climate of the Eastern States, when compared with that of Colorado, is so cloudy and damp and depressing, that one who has lived here for a year or two feels most deeply when he returns there the lack of blue sky and cheering sun.

Sunshine

The new life in the new country; the swift passing of events; the possibilities of advancement and of fortune; the stir incident to the beginning of things,—all these are attractive to many, and go far to compensate for the loss of old friends and for the breaking of home ties and for that shifting of the scene of one's life which is a hardship to most. But over and above all the attractions of the newness and the swiftness of western things, is the attraction of the climate of our State; and many who have come to Colorado for other reasons have been led to stay, because they feel that here, under our sun and the inspiration of our sparkling, dry air, their life would be happier, fuller, and more satisfactory than it could be under the too often clouded skies of the East and South.

The sun in Colorado—in that great tract along and among the eastern foothills, in which are located Denver, Colorado Springs, Manitou, Pueblo, Trinidad, Golden, Boulder, Fort Collins, and Greeley; in that region to which the tourist and invalid are most likely to come and in which they are likely to stay longest,—the sun here shines for about sixty-two hours out of every hundred that it is above the horizon. In Philadelphia the ratio is forty-nine. During the winter months, the trying time for the invalid, the difference is more striking still. In Colorado we have from December to March 56 per cent. of all possible sunshine. In Philadelphia they get but 37 per cent.; a difference in Colorado's favor of over one half. In ten

Duration of Sunshine

years there were in Denver, on the average in each year, 314 clear or partly cloudy days. In Chicago, in the same period, there were only 251; in New York, 262. During the three winter months, the sun shines four out of every five days. Nor do these figures tell the whole story. One of the greatest advantages of this eastern belt along the front of the mountains is the early morning sunshine. There are no high mountain ranges for the sun to climb, as in so many high altitude resorts in other lands, but its first rays above the low eastern horizon are at once warming and cheering. The sun is up before the invalid is awake, and the air is warmed for his outdoor life without a long wait until mid-morning. In Davos, Switzerland, the sun on January 1st does not rise until 10 A.M. and sets at three in the afternoon, a possible sunshine of only five hours. In Denver on January 1st the sun rises at half-past seven A.M. and does not set until after half-past four — more than nine hours of sunshine.

Neither do the cloudy days preclude an outdoor life, as might be inferred. They do not bring the damp and rawness of the Eastern and Middle States. To many there is a restfulness in a clouded day as a relief from the constant intensity of the blue sky.

The Temperature, Actual and Felt

The dryness and rarity of the air make the sun's direct rays hotter and seemingly more penetrating here than in lower altitudes. Colorado sunshine will dry the soil, soften the atmosphere, and warm up every one who steps into it after a winter storm in far less time than will the sunshine which falls through the damp and heavy atmosphere of the East.

Dry Air

The dryness of the air of this great mid-continental table-land, and the consequent rapidity of evaporation, must be kept in mind in considering Colorado's temperatures, would one gain an accurate understanding of the climate as one feels it. The

average July temperature of Denver is 72.1°. The sensible temperature of the same month—the temperature, that is, reduced to eastern terms—is only 57°. The Denver summer corresponds, as to the feelings of those who pass through it, to that of Manitoba, of the Thousand Islands, of the Adirondacks, or of the White Mountains (Captain Glassford).

Summer Heat

The summer heat is occasionally seemingly intense; but it is really little felt, causes very little inconvenience, and never any suffering. In the hottest of summer weather it is but a step from the sunshine into the shade, which is always cool. Sunstroke is here unknown.

Cool Shade

The coolness in the shade in Colorado, due to the very rapid dissipation of heat by reason of the rarity of the air, is something often spoken of but not easily impressed sufficiently on those not familiar with it. It makes it possible for one to live with great comfort even during a summer when the general temperature, as shown by a thermometer exposed to the direct rays of the sun, would seem to be almost unbearable.

Mean Temperature

The mean annual temperature of Denver is 50°, and the mean annual temperature of all the most thickly populated parts of the State, just east of the mountains, is from 45° to 50°.

Actual and Apparent Climate

Capt. W. A. Glassford, chief signal officer, department of Colorado, has contributed an article to the report for 1894 of the Colorado State Board of Health on the subject of actual as compared with apparent climate, and from this article some of the points given above are taken. "When the published record," he says, "of the heat in Boston, New York, Washington, St. Louis, and Chicago is above 100°, it is simply unbearable; while the same recorded temperature at Denver is attended with little discomfort.

Why? Because in the East moisture is present to a very considerable extent in the atmosphere, while in the West it is almost absent."

Owing to this great dryness of the air, and its small capacity for holding heat, there is throughout the year a difference of from 40° to 60° between the sun temperature and the air. It is this great difference which makes the summer air so cool and comfortable. And in the winter, when the air is cold and bracing, one has but to step across from the shade into the sunshine to find the great warmth of its rays—40° higher. In midwinter it is not uncommon to see two thermometers on the same veranda, one standing at 30° in the shade and the other in the sun at 85°.

The cold air in winter is not apparent or piercing as in damp climates, but clear and bracing, stimulating to nutrition and mental activity.

The Seasons

Speaking again of that part of Colorado which is most inhabited and is best adapted to the wants of the pleasure seeker or invalid, a strip of ten to fifty miles in width, where plains and mountains meet, —in the temperate belt, as Captain Glassford calls it,— one may say of the seasons:

Spring

In Colorado we escape March; that is, this month here is so much less a time of rain and snow and slush and mud and bitter winds than it is in the East, that it passes without particular notice. During the month of March and in early April, snowfalls are not uncommon; but they disappear very rapidly under the heat of the sun. In a few hours the snow has evaporated, there is no melting into slush or wet, and often twenty-four hours after one of these short snows the dust is blowing on the sunny side of the road. The rapid disappearance of the snow is as incomprehensible to one who has not seen it as it is astonishing to the beholder. The temperature in these months does not often fall below

30°, and commonly before the end of March the warm sunshine has begun to bring out the grass and swell the buds on the trees and call back the birds. April is a growing month, and in May the plains and the country generally are at their greenest.

The mean minimum temperature for March for ten years at Denver was 27.6°, and the mean maximum temperature for May was 68.9°. The rainfall in the whole three months of spring in Denver averages only about five inches.

Summer

June and July are the hottest months, and by August the mean temperature begins to decrease. The mean maximum temperature for July was 86.3°. The direct rays of the sun are very intense and hot, but the air is cool and dry, and consequently the heat is easily borne. It is rare to see moisture on the soda fountains, and there is the comfort of a dry skin and unwilted collars. At sunset the air at once cools rapidly, and the nights are always comfortable. There are comparatively few nights in summer when one does not need a blanket covering before morning. It is common to have heavy but short showers in the last of the afternoon or early evening during these months, especially near the mountains, but they are not an interruption to outdoor life, and serve to lay the dust of the sun-baked plains.

Autumn

The autumn in Colorado, as in many other regions, is the most delightful part of the year. From September to nearly Christmas there is an almost unbroken period of delicious, sparkling days. All over the State it is not uncommon to have, during these months, a period of six or even ten or twelve weeks with scarcely a cloud in the sky from day to day, a brilliant sun, and high winds only on very rare occasions. The ground is dry, the air—as the nights grow cool—is even more bracing than usual. In all

respects this is in Colorado the ideal season for the invalid or tourist.

The mean temperature of the air along the eastern foothills in Colorado (4000 to 6500 feet), taking Denver for example, is 63°; for October, 51°; and for November, 39°. At higher elevations in the mountains the nights get cool in September, and ice forms at 8000 or 9000 feet not infrequently in October; but even in high altitudes storms and periods of extreme cold in these three months are infrequent.

The fine weather of the autumn months often continues to the middle of November, and occasionally as late as to the last of December. A noticeable thing about the climate of the winter months in Colorado is that if one lives for a few years at a high altitude, even as great as that of Leadville—about 10,000 feet,—and then spends a winter or two among the foothills at an elevation of from 5000 to 6000 feet, he does not notice any great difference in the temperature of the winter or in the number and severity of the storms. In every part of the State below 10,000 feet and above 4000 feet there are during each winter several periods of from three to ten days of cold weather, usually preceded by a snow-storm, and perhaps accompanied by one or two days of considerable wind. But these periods of cold weather, even when on rare occasions the thermometer goes several degrees below zero, are not felt to anything like the extent that similar temperature is in a damp climate. And it probably is a fact that the physical sensations of a winter at 8000 or 9000 feet or at 5000 or 6000 feet in Colorado are very similar, and that the covering needed and the precautions naturally taken against cold are about the same nature in both altitudes. This fact is mentioned to call attention again to the persistent characteristics of the climate—dryness and sunshine—of every part of the State.

Winter

The sun is more often clouded in the winter months than in the rest of the year; but it cannot be too often stated that the winter's sun is warm and invigorating, and that there are few days in the whole season so disagreeable as to make it impossible for any ordinary invalid to remain out-of-doors.

Winter Sun

There is no accumulation of snow along the eastern belt of country—Denver, Colorado Springs, etc. A few days or a week and all traces of it are gone, save on the northern side of banks or sheltered places. And it disappears without melting into slush or icy pools; the dry wind licks it up into quick disappearing vapor. The snow does not house the invalid save while it is falling. There is no piling up of drifts to give a long, damp melting time in spring.

Snow

Along the eastern foothills the average midday temperature of the air is 45.5° for December, 27.3° for January, and 48° for February. The total rainfall in Denver for these three months in 1892 was 2.47 inches.

The open street-cars are run all winter.

The clothing worn in Colorado, save high in the mountains, is such as is commonly worn in New York and New England and in the Western States of about the same latitude, except that in winter the heavy overcoat is less needed, and in summer the thinnest underwear is apt to prove not quite heavy enough.

Clothing

The most fortunate and valuable feature of Colorado as a climatic station is that all its benefits and health-giving conditions are at hand and offered to the invalid without his going into exile to obtain them. He has not to seek a wilderness or a small sanitarium on some isolated Alp. More than any other factor should this fact appeal to the invalid. To recover his health in Colorado he does not need to exile himself from the comforts of his daily life or human intercourse. For the

Colorado a Home, not a Mere Sanitarium

clear, pure air which is so abundant, even the advantages of city life need not be foregone. To one with a family especially is it a rare privilege to find so easily a healthful outdoor life in sunny fields, a mile above sea-level, and yet give his children the advantages of schooling and civil education, libraries, opportunities for music and intellectual enjoyment. Denver can rightfully boast of one of the very best public-school systems in the land. Indeed, throughout the State the schools are all of the highest grade. With all the multiplied helps that a large city affords, there is always at hand the more varied attractions of a vigorous outdoor life.

Outdoor Life

Colorado climate invites to outdoor life. There is no season of the year in which one cannot be out-of-doors with comparative comfort. This, added to the facts that the air is bracing and the sunshine inspiring, leads to a great deal of walking, driving, riding, bicycling, and outdoor sports. The result of this on health is perhaps shown more clearly on children than on adults. When one considers that a very large proportion of Colorado parents are people who came to the State as invalids, the healthy appearance of the children one meets on the streets and sees collected in school-rooms or at play on the athletic grounds is something remarkable. They are full-chested, strong-limbed, and bronzed.

Healthy Children

Sanitary Conditions

Under the sanitary arrangements that have been put in force in our cities in recent years, it has rapidly stepped to the front as one of the healthiest cities of the whole continent, and this in spite of the fact that its population is constantly added to by invalids from the extreme East.

Business Openings

Not only does Colorado provide pleasant and helpful surroundings for the invalid during his convalescence, but it offers a greater advantage still in the opportunity for employment and

business enterprise after recovery of health. In many of the famed health resorts there is nothing but the dwelling-houses and the sanitarium on some isolated mountain side. When the patient is again able to resume his work in life, he is forced to return from his health-giving resort to the old conditions, exposing himself again to the treacherous climate from which he fled.

Colorado does not cure and then drive out, but rather welcomes the restored invalid, and holds out every inducement for him to remain.

The vast resources of the State are only beginning to be appreciated. On every side, agriculture, fruit raising, mining,—all offer a wide field for development and a rich reward for enterprise.

Cripple Creek

Cripple Creek was for long years only known as an excellent grazing country for cattle—till in 1891 it was found to be a gold district of now famous values. To show its wonderful development, the figures of its annual output are given: 1891, $125,000; 1892, $400,000; 1893, $2,500,000; 1894, $4,000,000; 1895, $8,000,000; 1896, 16 tons of gold; 1897, 25 tons of gold. There are other camps, old and new, and many districts yet unexplored, which offer similar opportunities for investment of energy and capital.

Gold

Coal, Iron

The resources of the State in coal and iron are equally great. The coal deposits are of great value, and the area of coal lands surpasses that of Pennsylvania by 8000 square miles. Pennsylvania has 10,000, and Colorado 18,000 miles.

Agriculture

Agriculture in every branch flourishes and is to-day the foremost industry, offering thus particular inducements to persons of moderate means who ought to follow an outdoor life. In 1895, 66,000,000 acres were under cultivation, producing a wheat crop valued at $4,000,000; alfalfa, $3,500,000; corn, oats, and

barley, $4,000,000; with other garden produce at $4,200,000. The production increases yearly.

Irrigation

Under irrigation, with a constant sun, there is no failure of crops, but large and abundant harvests are the rule.

Fruit Raising

Fruit raising is rapidly becoming an important industry, and the rare quality of Colorado melons and peaches is opening a large market for them in Chicago and St. Louis.

As all of these resources are developed, there comes in consequence more demand in all other lines of business, and new openings are created.

Here, amid civilization and all the advantages of city life and intellectual surroundings, is open country and outdoor life—diversion and fields for occupation. With the restoration of health comes no need for expulsion from this Eden to the old threatening conditions, but a welcome and open opportunities for industry and livelihood.

From start to finish the invalid is at home. There is no exile to foreign lands or strange customs. He is among his own people—in his own land.

Colorado, a Vacation Resort

Game

Nowhere in this country can conditions calculated to build up and refresh the mentally exhausted worker be better found than in Colorado. Its summer is cool, and in the higher parks and passes the nights are even cold. Its autumn, an unbroken stretch of glorious, cool, sparkling days. Game of every kind is abundant, and the opportunity for camping, hunting, and fishing ample and readily found. The railroads—there are 4700 miles in the State—will carry one to within a short ride, by horse or wagon, of yet unbroken wilderness. By pack train a few days' journey will lead to the wilds, where each spot visited is an undiscovered place. Wild game, large and small, are present on all sides, and

without a care one can drop back to a life of pristine simplicity, free from all trammel of convention.

Ranches, farm settlements, mining camps, and summer resorts are scattered throughout the mountains in most unexpected places, and are connected with one another by railroads or wagon roads. Camping outfits may be bought or rented in Denver or in any of the larger towns of the State, and at many of the small resorts special attention is paid to fitting out the camper.

I have departed somewhat from the usual form in this brief description of the climate in eastern Colorado, as, however valuable the long and dry details of compiled data may be from a climatological standpoint, the average invalid derives little, if any, practical knowledge from long tables of humidity, rainfall, dew point, wind velocity, etc. I have therefore made an effort to present to the average reader some idea of the actual time an invalid (we will say one who is able to be about) can safely be in the open air daily during the year. To arrive at this fact I have not consulted meteorological tables, but have kept each day a record of how much time the average invalid under my care could spend out-of-doors without risk. I observed only the hours from 9 A.M. to 6 P.M. The result of this investigation has not been quite as favorable to the climate as some climatic data would lead us to suppose, but

Invalids in the Air Daily

it has, however, the virtue of being true, and to that extent can be relied upon as a guide. Such a system has at any rate the virtue of being practical, while meteorological tables are often far from being of direct usefulness —as, for instance, we may have an ideal table for an invalid; the sunshine, humidity, temperature, and wind velocity may all be favorable to life outdoors, and yet a moderate wind may raise such a dust that a retreat indoors is a necessity to an invalid, although the meteorological tables will show nothing of such a factor as dust. Other errors can also be shown in this connection. For instance, the difference between a wet- and dry-bulb thermometer, when read in a table, does not impress the average reader with its significance; but the amount of dampness in the atmosphere determines to a very great degree how much a person will feel the cold and heat. A temperature which would be unbearable in a moist or moderately moist climate, like that of some of our Atlantic States, would not be felt with anything like the same degree of discomfort in Colorado. Some years ago I rode horseback some sixty miles in a day to see a patient, doing this in the summer in the country where the altitude was 5500 feet.

Meteorological Tables

The temperature stood, as I was afterwards told, at from 100° to 102° F. in the shade. I felt the heat, but in New York State a sixty-mile ride taken at any such temperature of the air would have been decidedly dangerous; it was the dryness of the air in Colorado that made the difference. With cold, the same moderation of extremes of sensation is observed. In Colorado Springs, when the temperature is only 10° above zero in the shade, I frequently see people riding wheels without overcoats. There is a bright sun and the air is so dry that one can hardly realize what the actual temperature is. Consequently, the thermometer is a very unreliable guide unless we also calculate the humidity.

I have found by actual observation that, taking out time for meals, etc., the average invalid, not in a sanitarium, spends about six hours daily in the open air during winter. In a record made by me and presented before the Climatological Association in May, 1899, there were found to be but seven days from December 14th to April 30th that were not suitable for treatment outdoors in a sheltered place, and patients have assured me that, in some sanitaria abroad, and also in this country where they have been treated, even these

days would have been utilized, and patients made to stay out without comment. The record mentioned was taken from a winter of unusual severity.

Cured Cases Going to Lower Altitudes

It has frequently been said that a cure in Colorado is a cure only so long as the person remains in the State, and that a return to lower altitudes brings a return of the disease. I feel that in many instances this impression has arisen from the fact that persons have returned to their homes in the East when they were not at all cured, but were supposed to be, and that a return of their disease ensued with a return to unfavorable conditions. For, as Professor Allbutt says,[1] "No man is cured unless he can stand the stress and strain of his ordinary life for at least two years." And the same rule being applied to the so-called "cured" consumptives in Colorado would, I am sure, show many cases that could, without danger, live at a lower altitude and in a more moist climate. At the same time it cannot be denied that if the elevated table-lands of the West produce an expansion of the chest and increased lung capacity, any

[1] "Sanitarium Treatment of Phthisis," *British Medical Journal*, October 28, 1891.

return to a lower altitude, such as to sea-level, must be attended with at least some of the dangers due to disused lung tissue, and a condition incurred which is similar to that of a trained athlete who suddenly adopts a sedentary life. Of course, if pulmonary exercise were systematically taken at the lower altitude, the danger from disused lung tissue would be materially lessened. There is, however, a distinct risk to patients returning to sea-level after they have had an arrest of their disease in Colorado, the danger being not so much the climatic change, as the fact that, on their return, they make a complete change in all their habits, living sedentary lives, breathing indoor air, with the worry and strain of business often added to the other factors.

Remaining for Life

I think that by far the best plan for the invalid who has had an arrest or partial cure of consumption in Colorado is to decide to remain for life, as the chance of lighting up latent disease upon a return to the old environment where the disease first developed is, as a rule, too great to be undertaken. The few who succeed in living in their old homes are only the exceptions which prove the rule.

[1] There has been, however, for some time, especially in the eastern cities, considerable alarm expressed about coming to this practically non-tubercular belt for fear that in its towns filled with consumptive invalids there is great danger of contracting the disease. This impression is very strong, is constantly gaining ground, and even doctors are warning their patients not to come to Colorado for that reason. The newspapers have taken it up and several articles have appeared; one in the New York *Evening Post*, which was largely copied, denouncing Colorado Springs as a plague spot and painting the danger and risk from infection with consumption in the most vivid and glowing colors. This article was, no doubt, regarded as true by many people, as it received a wide publicity in the papers all over the country, and, as far as I know, was never denied; so that it probably has been accepted by the average reader as correct.

Contagion in Colorado

Now, at first sight and without positive knowledge to guide one, it cannot be denied that the greatest danger from infection must exist where there are the greatest number of consumptives to communicate the disease. Other things being equal it would be so. But other things are not equal, at least in Colorado and in places with a similar climate, because the factor climate comes in. That makes all the difference, and it is to determine practically this difference between other climates and this climate of Colorado that for some years I have been collecting statistics and making experiments so as to take, without reserve, all the evidence that presents itself on this subject.

The Climate

[1] From a letter by the author on *Infection from the Tubercular Invalid in Colorado Springs*, to New York *Sun*.

It is estimated beyond doubt that consumption is communicated from the sick to the well by the expectorated matter when it becomes dry and is drawn into the lungs in the form of dust. With a view to ascertaining how communicable the disease is in this climate, I have for a number of years made a careful study of the dust germs in the air in Colorado Springs and the surrounding country. The air has been analyzed day and night, indoors and out. It was found by these experiments that the air all over this elevated region, on the prairies, the foothills, and high mountains, was quite free from any germs; in the town itself there was the average number of germs common to any place of its size, increasing in a regular ratio from the thinly settled portions to the more thickly settled parts, as in other towns; so that the results were negative, with the exception of the wonderful purity of the air everywhere except in the immediate vicinity of human habitations.

Mode of Infection

The Condition of the Air

In the next experiments dust was taken from the walls of rooms occupied by consumptives in houses, hospitals, sanitaria, and hotels. The dust was carefully removed from behind pictures and similar places, and then injected into animals, which were killed after a certain interval and examined for consumption. These experiments are nearly completed, and will be given to the medical profession at the proper time and place.[1] The results indicate very clearly that the dust in Colorado Springs at present is not as dangerous as it is under like conditions in a more humid climate, such as that of a town not situated in this dry, elevated region.

The Dust

[1] Paper read at Congress of American Physicians and Surgeons, Washington, D. C., 1897.

They also show that a climatic force is at work, which, by first impairing the vitality of the germs, and secondly by improving the vitality of the animals, gives a double safeguard against contagion. The animals used in these experiments were freshly imported from Ohio, and since they were not native, represent as nearly as possible the condition of a visitor from the East just arrived in Colorado. It is well to consider this subject of contagion from consumption in Colorado Springs not only from the point of view of laboratory research, but from a more practical basis as well, and one that any layman can understand.

Climatic Environment

The fact that consumption is transmitted by germs is well established, for many cities with other climatic conditions (such as damp soil and greater rainfall), but it is not necessarily true here in anything like the same degree; climate, as I have said, makes all the difference. The physical influence exerted on a man or an animal by the climatic environment which results from two hundred days of sunshine per year, fifteen inches annual rainfall, dry, sandy soil, and six thousand feet altitude, when compared with one hundred days of sunshine, forty-nine inches annual rainfall, damp clay soil, and no altitude, makes a difference that is a powerful agent for good or bad.

Apparent Drawbacks

At first sight, however, some factors would seem to favor contagion from consumption in Colorado Springs. There is about one consumptive to every six of the inhabitants. Since the air is dry it hastens the drying of the expectorated matter, so that it is more easily carried about in the air. Many of the inhabitants who are not consumptives are, from family history, probably more prone to contract the disease than the average person. All these facts

would seem on their face to point to the danger of contagion; but let us consider the other side of the question.

The germs once on the ground are more rapidly killed by the action of the sunlight,[1] which, coming as it does through a generally cloudless sky and very thin, clear air, acts far more promptly as a disinfectant than in a more humid climate. It is an equally important point that the sun shines here more hours per day than in most places. Even when inhaled into the lungs, the tubercular germs are met by a system strengthened and rendered antagonistic to infection through climatic environment. In other words, the climate of all our high, dry plateaux renders it more difficult for the germs of consumption to maintain their virulence or to find a suitable soil in the

Effect of Sunlight on Germs

[1] "First having established the fact that fresh tubercular sputa injected into rabbits (either into the vein of the ear or the lower abdomen) produced a general tuberculosis within twenty or thirty days, quite as has been found under all climatic conditions, I selected the sputum which I had found contained tubercular bacilli, and from a patient, if possible, whose sputum had proved to be virulent at some previous time. This sputum was exposed to the direct rays of the sun for varying periods, and at different situations, with a background of sand, stone, or wood. After the exposure to the sun the sputum was rubbed up with sterilized water and inoculated into the thigh of a guinea-pig.

"The animal was killed in from thirty to forty days after the time of inoculation. Some thirteen guinea-pigs were inoculated with 0.3 c.c. of sputa and water. The sputum was exposed to the direct sunlight for from one hour and three-quarters to twelve hours. It was found that it took more time to dry the sputa in any

body or lungs for their growth. Now this is not conjecture on my part. If there is, as has been feared, great danger from contagion in Colorado Springs, surely it is a fact easily observed. The objection cannot be raised that, like many health resorts, Colorado Springs has only a transient population, and that people who have been infected pass rapidly from observation and do not live long enough here to be reported. Colorado Springs is essentially a city of homes, where people come to live for years; the city has been in existence for twenty years, and the permanent population is large enough to enable one to secure careful statistics.

Native Cases

In 1892 the writer published in the *American Journal of the Medical Sciences* a report on all the cases of non-imported consumption which had occurred in the city for fifteen years. A year was spent in collecting these cases with their histories. Six of them died. Since that time there have been five more cases. Four of these died, making ten deaths in all in twenty years. This number is so small as compared to

Number of these Cases in the History of the City

quantity than was anticipated, and that, even when dried, the mass was so firm that the current of air from a blowpipe failed to detach even minute quantities; so that, without in some way grinding up the sputa, when dried, as is done by wheels or soles of shoes, it really could not be said to be dangerous and capable of infection. The result, however, seemed to show that sputum so dried in the sun at six thousand feet altitude was quite as capable of giving local or general tuberculosis as elsewhere, at least, taken as I took it, from a mass of at least two drachms, and not distributed in dust as it is inhaled."—Read at Congress of American Physicians and Surgeons, Washington, D. C., May, 1897, by C. F. Gardiner, M. D.

the number in any town of its size of the United States as to make it seem unreasonable. The average number of deaths from consumption to each thousand of the inhabitants in most cities is three. But these three deaths, it should be remembered, represent only a small part of the whole number of people who contract the disease in that city, as, with the present knowledge of climatic cure, a doctor sends his consumptive patients away some little time before death; at least it is to be hoped that he does. Many go also of their own accord, and if any of these die, they are not added to the death statistics of their own city, but to those of some health resort. It is, too, a well known fact that death returns are frequently "doctored," and the words tubercular and consumption are not put down for fear of objection on the part of some insurance company; hence, three deaths per thousand is clearly not an overstatement. It is, in fact, a conservative estimate. It is also true that these three deaths represent cases of persons who have contracted consumption in the place where they die, as people do not generally go to a city to be cured of consumption.

Therefore, according to statistics, Colorado Springs, with 20,000 inhabitants, should have had last year just sixty deaths from non-imported consumption to put it on a par, as regards danger from contagion, with Boston, New York, or Philadelphia. What are the actual facts? Last year but one such death occurred. There was reported to the city physician only one death, and careful inquiry of all physicians and others failed to reveal any more. Nor can it be said that more have occurred and passed unnoticed. The doctors of Colorado Springs are, from necessity, practical specialists in consumption or tuberculosis; they are keenly alive to its detection, and therefore our statistics for that disease bear comparison with those of any city in the country.

This low mortality from consumption contracted in Colorado Springs is not an isolated instance; probably all cities or towns situated on this high, dry plateau would show very much the same record. The city of Denver, seventy-nine miles away, in practically the same climate, illustrates the fact that this place is no exception. Last year Dr. Munn, city physician of Denver, reported sixty-four deaths from non-imported consumption to 150,000 inhabitants, or less than one-half a death per thousand; and Dr. Sewell, after much research, showed in 1895 a rate in Denver of about one-third of a death per thousand of non-imported consumption.

Other Colorado Cities

These facts[1] are not confined to mankind. A general immunity, from living in this country, is also found in domestic animals. In dairy herds, where general environment, character of food, shelter, and all conditions bearing on general health are more likely to be the same in every climate, than those of man, we have the same result, namely, that consumption among cattle is here most infrequent. Careful reports show that all through a large part of the United States cattle are sacrificed to this plague of tuberculosis or consumption, and the opinion is gaining ground that milk taken from cows so diseased, when it is used as food, is in a great measure responsible for many cases of consumption occurring among mankind.

Consumption among Animals in Colorado

Reports show that from twenty-five to fifty per cent. of eastern cattle are tubercular. The reports of the State veterinary for Colorado show only two per cent. in

[1] See *Journal of the American Medical Association*, February 3, 1900; *The Elimination of Tuberculosis Out in the Open*, p. 309.

our herds when the tuberculin test has been made. The testimony from all over our high plateau, which is from five to eight thousand feet above the sea-level, is the same. If, then, it is true that consumption is very often contracted by drinking milk from consumptive cows, this fact that our cows are so remarkably exempt from this disease adds another factor to our safety. If only two cows in the hundred have consumption in Colorado, and twenty-five to fifty in the hundred have it in the East and elsewhere, there is not much room for doubt as to the comparative danger from milk infection. In a drink of milk taken in any of our average cities below two thousand feet altitude, we run about thirty per cent. more risk of contagion than we do in Colorado Springs.

Relative Numbers Infected

It may make it plainer if, for the sake of comparison, I illustrate the truth of some statements I have made by a supposable case. We will, for example, suppose there is a city or town situated on the Atlantic coast (or anywhere not in this dry, elevated region), a city of twenty thousand inhabitants which has existed for twenty years and has increased at a constant ratio of about one thousand per year—in fact a town as nearly like this as possible, but without this special climate and without invalids. Now a man living in this city of the East, with its damp climate, wishes to visit Colorado Springs; he would like to see friends here, or the country, or take a holiday of a month or so, but he fears to come. Why? Because he has heard that there is danger of catching consumption in Colorado Springs; the entire city is crowded with invalids, and he may contract the dread disease by coming in contact with them. So he stays at home, where he feels safe from danger. What are the actual facts? His own city, where he feels so safe from infection, has had

Comparative Statistics

during the last twenty years just 630 deaths from consumption (at a ratio of three deaths per thousand), all without doubt contracted or "caught" in that place. Colorado Springs, where he fears to go, has had ten deaths from consumption caught here during the same time and with the same population.

These are actual statistics and not based on any guess. Our mortality from consumption contracted in Colorado Springs has been ten in twenty years. A town of the same size and gradual increase in population in the East would have had 630 deaths from the disease in twenty years. We stand, therefore, about one sixty-third as much chance of contracting the disease here as we do in a city of the same size in the East; and any one who fears to leave his home and come to live here because there is greater danger here, either does not know the actual facts, or is very weak in arithmetic, as the ratio of 630 to ten does not require a mathematical mind to understand, and is so overwhelmingly in our favor as to leave no room for doubt that the danger of contracting the disease here is not based on any fact or truth whatever. I do not stand alone in my opinion regarding the small risk of infection here. I have asked all of the doctors practising in Colorado Springs, whose experience extends over a period of some fifteen to twenty years each, and they one and all have expressed themselves as agreeing with me in the conclusion that contagion is a thing of very rare occurrence.

Comparative Risk

We have seen that practical statistics, carefully taken, show that consumption does not develop in this high, dry climate to anything like the extent that it does elsewhere. Fifty or sixty develop the disease in the East to one case developed in Colorado Springs, in spite of its consumptive

Cause of this Immunity

population. Now why is this? To say that it is due simply to the climate means very little. There are probably many factors. In my opinion, this climate, after some twenty days or more, produces a condition of body that resists infection. Lungs that are well used, expanded by deep breaths so that every cell receives fresh air, are not likely to hold the tubercular bacilli, or allow their growth if they do lodge there. At this altitude the lungs are constantly exercised by deep breathing. Persons whose blood is, as we say, thin or watery, are most liable to consumption. The blood of people living at this altitude is generally thicker than that of people who live at the sea-level. The difference is very slight, of course, but thick blood acts more rapidly to destroy germs than thin blood does, and therefore people living here have blood that is inclined to be germ-proof.

As has been shown, the germs of consumption outside of the body, before they can infect another person, have to run the gauntlet of sunlight—a sunlight far stronger and more effective both in point of quality and quantity as a germ destroyer than most climates have. Furthermore, in eating meat or drinking milk the risk of tubercular infection is, at this altitude, reduced to a minimum, as so few animals are ill of consumption.

Outdoor Life

Then, quite apart from any scientific reason, there is far more outdoor life in this climate, and an outdoor life is one of the greatest safeguards against taking consumption; so that, although our cases of infection from consumption are so few as to excite wonder and even doubt in many minds, both common sense and science unite to prove very clearly that it is merely a case of cause and effect. The influences acting against infection are many and powerful, and the effect follows of course.

Precautions in the Future

As Colorado Springs grows larger and its inhabitants lead a more sedentary life, as indoor occupations become more frequent, and as tall buildings are raised which shade our streets and shut out sunlight from rooms, we shall be in a much more dangerous position than we are at present, because it is highly probable that, as the bad hygienic conditions engendered by overcrowding or by increased population, exert their harmful influence, we shall be more and more liable to infection from consumption; therefore it will not do to disregard the precautions which are being taken now to overcome this danger in our large eastern cities;[1] such measures, even if not so necessary here as elsewhere, do assure people, and show them that we are at least keenly alive to the importance of prevention. I can only assert most positively in regard to contagion, that there is not at present in Colorado Springs any evidence to show that the risk due to contracting consumption from those ill with the disease, is a matter over which the public mind need be disturbed.

[1] This has, as I predicted in 1892, occurred in Denver. "But the number of cases contracted in Colorado is on the increase and markedly so. The records of the Denver Bureau of Health show that of the deaths from tuberculosis occurring since January 1, 1893, the following were specified as contracted in Colorado: 1893, 49; 1894, 51; 1895, 64; 1896, 66; 1897, 88; 1898, 99; the percentage to the total number of deaths from this disease passing successively from 11.26 in 1893 to 13.52 in 1894, 14.95 in 1895, 17.93 in 1896, 17.99 in 1897, and 19.77 in 1898: hence every citizen should be informed as to the sources of danger and how to combat them."—From Colorado State Board of Health, 1900.

Altitude, or climatic, effects upon man on the Colorado plateau are about the same as the following :

Effects of Altitude

Tuberculosis and Altitude.—In a recent work published in Mexico (*La Vie sur les Hauts Plateaux*), which won the Hodgkins Prize of the Smithsonian Institute, Herreta and Lope devote a chapter to the treatment of tuberculosis by altitude, noteworthy in many respects. They find that statistics show that not only in men, but in lower animals, tuberculosis is decreased in high regions. In 1885, out of 73,000 cattle killed in the general abattoir of the City of Mexico, only forty-five were tuberculous. This favorable effect they attribute to the high solar illumination in high altitudes, and the dryness and coolness of the atmosphere as working against the existence of microbes. The benefits of rarefied air in consumption are given by the authors from their experimental and other observations, as follows: (1) Lessening pressure increases the circulation of air in the lungs, dilates them and obliges torpid parts to functionate. (2) Lessening pressure determines a greater quantity of blood in the lungs. (3) Lessening pressure permits a uniform distribution of blood, regulates its circulation and combats congestion. (4) Lessening pressure diminishes intrapulmonary tension in general and particularly intervalvular tension. (5) Augmentation of red and white globules. (6) Dessication of mucous surfaces; the favoring of evaporation, besides experiments upon animals, observations of actual cases of tuberculosis, treated by rarefied air, are reported by the authors. Of thirteen patients thus treated, only one lost weight, one remained stationary, and eleven notably increased, one increasing three hundred grams in one day. In none,

either healthy or tuberculous, were the alarming symptoms described by Paul Bert experienced.

Cases that should Come to Colorado

The cases that do best in Colorado are the cases that do pretty well in any favorable climate: that is, invalids with money enough to do as they please, who are also supplied with a reasonable amount of common sense, and who have merely a simple catarrh of one lung limited to a small area, with good digestive powers and a favorable family history; cases that are slowly clearing up from pneumonia; cases where the disease, although advanced to the second stage, is limited to one lobe, and the patient has shown a decided tendency to resist the tubercular and septic poisoning.

Pneumonia

Anæmia Neurasthenia

Cases of simple anæmia, or of nervous prostration, do well as a class. The common impression that a dry, elevated climate is not adapted to the general nervous invalid is not borne out by observed facts. I have seen, in my own practice, neurotic invalids, or those suffering from epilepsy, chorea, cerebral exhaustion, etc., improve on coming to Colorado. The popular impression, that in Colorado the nervous system suffers, is met on every side; but

Dr. Howell T. Pershing and Dr. Eskridge, nerve specialists of Denver, have both assured me that they have not observed this effect in their practice, and that the typical nervous invalids do quite as well, if not better, in Colorado.[1]

Cases that should not Come to Colorado

Cases in the first stage of pulmonary tuberculosis, where the disease is scattered through both lungs, the pulse weak, temperature high, and dyspnœa marked, with unfavorable family history; cases where the consolidation of lung tissue is so great as to cause much dyspnœa; or old fibroid cases with dyspnœa, where the heart is weak and unequal to the strain of forcing blood through pulmonary obstructions.

Heart Disease

Dr. Babcock of Chicago says, speaking of heart disease in relation to altitude:

> Consequently those forms with which high altitude is likely to prove incompatible, are pronounced aortic or mitral stenosis and regurgitant disease, complicated by pleural and pericardial adhesions. On the other hand, patients with uncomplicated, regurgitant lesions or arterio-sclerosis, with or without myocardial changes, may endure low atmospheric pressure without injury.[2]

[1] These statements were made in private letters, February, 1900.

[2] Robert H. Babcock, "High Altitudes and Heart Disease," *Medical News*, July 15, 1899.

Under the head of cases which should not come to Colorado must be included also cases with emphysema, weak and dilated hearts, or with very rapid pulse; all uncompensated cases of valvular heart disease.

Invalids who are so poor that they have to work for their living at once and before they have improved in health should remain at home, except, perhaps, in those exceptional cases where there is merely a slight involvement and but little loss of flesh, and moderate fever.

Tubercular Laryngitis

In tubercular laryngitis it is a question between the irritation of dry air and some dust and the benefit conferred by the anti-tubercular climate as to whether the patient should try the climatic cure; it is an experiment at best. With bone or glandular tuberculosis it is different, as it has been pretty clearly shown that such cases do much better in high altitudes than in lower and damper climates. I have seen one case of primary intestinal tuberculosis where the patient improved so materially in Colorado as to return home, after four months' stay, to go into business again. Asthma is often cured, but not all invalids of this class are benefited, and some are relieved for only a year or two, and then relapse again.

Bright's disease covers a wide field, but it is my impression, from the cases I have seen, that, with albumen and casts in the urine, the patient can be more comfortable in a more equable climate.

Bright's Disease

The young man or woman who has a badly formed chest, is anæmic, has a tendency to colds with a cough in winter, who has lost one parent and possibly a brother or sister with consumption, cannot do better than to come to Colorado; for such cases I believe it is by far the best climate on earth, as the life outdoors is made attractive, and the sunshine and dry air promote health and vigor.

Weak-Lunged People

Railroads

The cost of reaching Colorado from the Eastern Atlantic States is, including all expenses, namely: First-class ticket, sleeper, meals, fastest trains, etc., $70. This rate is from such points as Boston, New York, or Philadelphia to Colorado Springs or Denver. Under ordinary conditions of weather the trip is comfortable. There are dining-cars and vestibule trains all the way through. The time from New York is sixty

hours. The average invalid—one who is able to walk about and has little fever—does not feel injury from the trip; the majority of very ill cases should remain at home. During the heat of summer it is apt to be dusty going through Kansas or Nebraska, and at certain times there will be periods of a few hours when the heat felt in the cars is dry, burning, and furnace-like.

Expense of Living in Colorado

Like living in any other place, the expense of living in this State depends largely on the person. I think it is fair to say that Colorado, as a State, is an expensive place to live in. Servants' wages, for one thing, are higher than those usually paid in the East. Many foods, especially those which have to be shipped in from other States, cost more than in towns of the same size east of the Mississippi River. House rents are, as a rule, high; in Colorado Springs they are higher than in Denver. In the latter city they are generally fifteen per cent. higher than in any Eastern town. The taxes are also very high. All this contributes to render living

Wages

Food

Rent

an expensive luxury in the West, unless precautions are taken. The rates at the hotels and boarding-houses, however, are not as excessive when compared with other places, and range all the way from $7 to $25 per week for room and board.

Board

At present I have patients who are paying $5 a week for room and board; the house is open all around to sun and air, the rooms are heated by stoves, and the board consists of good, nutritious food well cooked, as I know from personal observation.

I hope the inference will not be drawn from what I have said about the expense of living in Colorado, and especially in Colorado Springs, that it is impossible to live cheaply, because this is not so. If, for example, a family wishes to practice a rigid economy, it is quite possible to accomplish a very moderate scale of expenditure. A small, unfurnished house of four rooms, not in the fashionable quarter, can be rented for ten or twelve dollars a month. A furnished house costs twelve to twenty-eight dollars; the servant question is eliminated if one does the household work. oneself. The actual cost of food is not high.

Unfurnished House

Furnished House

Meats cost less than in the large cities of the East, and many vegetables are no more expensive than in such towns.

Foods, Cost

Gas is $1 per M (fuel gas); electric light costs about 1 cent per hour for each 16-candle lamp. A limited telephone system costs $35 per year. Electric cars furnish a means of getting about the town and the adjacent country. Servants' wages are, cook, $25.00 per month; housemaid, $20.00. Washing costs 60 cents per dozen. Range coal is $4.50 per ton. Meals are 25 cents and upwards.

Cost of Light

Telephones

Potatoes, $1.25 per bushel; oysters on the shell, 50 cents a half dozen; quail, 25 cents each; turkeys, 15 to 18 cents a pound; mutton, 15 cents; beef, 18 to 22 cents, etc. A saddle horse costs $1.50 for a half-day; buggy and horse, $2.00; buggy and horse with driver, $2.50 (no reduction is made for shorter time).

Prices of Articles

Cost of Livery Service

There are also one or two ranches within twenty miles of the town where the food is good, the rooms are warmed with a fire, there is an abundance of eggs and milk, and the boarder is given the use of a horse, — all for six dollars a week. When I say the food is good, I

Ranch Life

do not mean that it is the best for a pulmonary invalid. The ranches, almost without exception, use fresh meat (beef and mutton), and the rancher will speak with some pride of how fresh the meat is; needless to say, such meat is indigestible. The meat is also always cooked in a frying-pan. The prevailing idea which seems to exist among a certain class of people is that ranch life is the beau-ideal of an outdoor existence, with abundance of milk, eggs, and good beef to eat, open fireplaces to sit by, with a broncho to ride at will over the rolling prairies, and with it all a spice of romance pervading everything, and, finally, a quick return of health as the result of it all. There may be ranches where this ideal perfection is a practical reality, but I for one do not know of them. I have been over the States of Colorado and Wyoming on horseback, and at one time practised medicine for four or five years at a place a hundred and fifty miles away from any railroad, among ranches in a cattle country, and my experience has been that it is all a well man can do to digest the average ranch food, and that most ranches are no place for an invalid. The principal diet, as far as my rather extended observation went, was salt pork cooked

Ideals of this Life

in a sea of lard, soggy potatoes, baking-powder biscuits, washed down with black, reboiled coffee, all taken with great haste and in absolute silence. Anything better or more varied was always a surprise to me; and it was, indeed, a noteworthy exception when I had properly prepared meat or vegetables at a ranch. No fresh air can at all compensate for malnutrition engendered by a faulty preparation of food, and the ranch-cured cases are, with few exceptions, as far as my experience goes, survivals of the fittest, and are persons who have unusual digestive powers; such cases represent but a small proportion of those that seek such a life as a cure for lung trouble. Then, too, ranches are usually built with but little regard for either the picturesque or sanitary surroundings, and are only too often so situated as to be in barren and desolate parts of the country, besides being unhealthy from defects in local drainage or soil, with all the trees in the neighborhood cut down for fire-wood, and the only alternative which a person has is to sit outdoors in the blinding sunlight or indoors with the ever-present torment of flies. Such ranching, with all its discomforts, soon produces in a sick "tenderfoot" dyspepsia

Food

Situation

and condensed homesickness, alike fatal to improvement.

Besides the drawbacks already mentioned, the position of a ranch is usually far from a town or a doctor, and when any emergency arises in the invalid's life, it will take hours, perhaps days, to secure medical aid.

Ranches Remote from Doctors

The selected cases, of good physique, with but very moderate trouble in the lungs, good digestive power, those who will take to outdoor life, — for such persons a ranch life often does wonders, turning the anæmic, narrow-chested, weak boy into a stalwart, bronzed specimen of humanity, apparently working a complete revolution in the space of a few months. For such people the result amply justifies the risk, but they are few and far between, and do not represent at all the usual type of invalids who come West.

Cases that can Go on a Ranch

Over-Exertion—Horseback or Wheel Riding

I feel impelled to emphasize the ill effects of over-exertion upon pulmonary invalids when they first come to Colorado, as it is unfortunately a frequent occurrence to see invalids suffer decided

injury from ignorance regarding the climate and the amount and kind of exercise that should be taken by a new arrival.

The first effect of a climate like that of Colorado is to stimulate the action of the heart so that the pulse beats from ten to fifteen times a minute faster than at the sea-level, at least for the first few days after arriving. The air also has a stimulating effect which tempts one to take exercise. But a reaction will follow this first effect of the climate sooner or later.

First Effect

An invalid sent to Colorado for "lung trouble" or consumption, who has one lung affected and has lost some weight, and has slight fever in the afternoon, generally flatters himself that he has only some "little bronchial trouble." His doctor at home has told him: "You have very little the matter with you. Go out to Colorado; don't go to any doctor, but ride a horse, keep in the open air, and in a couple of months you will be all right." Such advice is cheerful and pleases the patient, but the result is not satisfactory; the invalid is no sooner in Colorado than, anxious to recover health as soon as possible, he straightway orders a riding horse or a wheel, and, filled with enthusiasm and stimulated by the bracing air, he

goes for a ride, spending perhaps several hours in the saddle, although he may not have been on a horse before for months. The results are not apparent at first; in fact, it is quite likely he will return delighted with his experience and tell his friends, if he has made any, that he feels better already; his appetite, sharpened by the keen air and exercise, is stimulated beyond his needs or digestive power, and a heavy meal is followed by languor or acute indigestion. The tired body now feels the reaction of over-exertion and climatic influence, and the pulse beats rapidly, the temperature rises, and when the doctor arrives, he finds, more often than not, a sick man who is fortunate if there is not an actual extension of his disease on account of this over-exertion, and who, as a result, will probably have to keep his bed for several days. I have recently had a patient under my care who was told to "walk and get well in Colorado." The poor fellow followed out the advice to the letter; he came to Colorado and for five weeks walked five miles a day. Finally his condition was such that from very weakness he could not walk any more, and I was called in only to find his case hopeless, although he assured me that he was only slightly affected

in one lung when he came to Colorado five or six weeks before.

This does not mean that no exercise should be taken by the invalid in Colorado; in no part of the world are the benefits of properly applied exercise in the open air so marked as in Colorado, but before exercising much one must become acclimated and then be examined by a physician to ascertain his fitness for exercising. After these measures have been taken, then exercise with caution, noting any ill effects which may follow.

Hunting Trips; Long Drives

Hunting trips, or simply drives or rides of several weeks' duration, are no doubt of much benefit to a certain class of pulmonary invalids, but to advise such recreation indiscriminately to all invalids that come to Colorado is, in my opinion, a serious mistake. The fatigue of travel, the changes of altitude and temperature are not at all desirable for people who are as delicate as most pulmonary invalids, and the results of such a trip are often disastrous to the patient. Generally speaking, I should say that the invalid who desires to go on a hunting or fishing trip must be in fairly good health, at least comparatively speaking. He

ought to be able to ride five miles in the saddle, or walk over rough ground for a mile or more, without elevation of temperature or other ill effects. If this trial results satisfactorily, and a physician, after considering the patient's condition, has deemed it wise for him to take the trip, it often follows that the decided change in all the habits of life will produce marked improvement. The beneficial results from these trips have been so great as to induce some invalids I have known to regularly spend four or five months in camp, far from civilization, every year.

The easiest course to pursue, provided the expense is not too great, is to go to some place in the State where there are guides that make a regular practice of taking parties after game. Such a place is Marvine Lodge, above the town of Meeker, in Rio Blanco County, the town of Meeker itself, or Rifle, or Steamboat Springs. Good guides can be found here for three dollars a day, with riding horse and pack horses at one dollar each per day. Food, renting of tents, etc., will make the cost of the trip for a party of three or four about six dollars each per day. If one person goes alone and takes one guide, eight dollars per day will

Expense of Hunting Trip

cover all expenses. The fall, from August 1st to November 1st, is the best time to take one of these trips. Elk, bear, deer, and mountain lion may be killed at this season.

Time to Go

A great deal of comfort may be secured in a well-managed tent. In fact, one can be well taken care of, even to the extent of a cold bath in the morning in a well-warmed tent. The advantage of having a man trained to take care of the camp, do all the heavy work, and attend to details, is decidedly evident upon trial, while the chance of obtaining game, seeing interesting features of the country, are greatly increased.

Fishing

Trout fishing is also excellent in many parts of the State.

An interesting and healthy life can thus be led in Colorado, especially during the summer and fall and often even until Christmas.

Driving

A sensible way to see the country is to hire a man who can cook, a good team and covered wagon. Trips can then be taken in many directions, and even if no hunting is done, the scenery and the novelty of such an outing will be long remembered with pleasure, and the camera pictures often looked over for years after.

A word of caution is necessary in regard to clothing. Even in summer the difference between day and night, or between sunshine and shade, are much more marked than one finds in a moister climate; add to this the effect of altitude, as when an ascent is made over a pass from about six thousand to eleven thousand feet, — such sudden changes test the best-equipped wardrobe. I have driven in a buckboard over much of the State of Colorado during the last fifteen years, and I have actually found most acceptable, at different times in the same twenty-four hours, a fur coat and a white umbrella. This no doubt seems rather ridiculous, but during the heat of the day — from twelve to three o'clock — at six thousand feet elevation in a red rock cañon with narrow walls, I was very glad of the grateful shade of my umbrella. The same night, crossing a divide at eleven thousand five hundred feet, the wheels of my buckboard broke through thin ice on some pools of water along the road, and a keen wind made my fur coat feel none too oppressive. From this it will be seen that a delicate man or woman on a driving trip in Colorado will have need for warm wraps in abundance, as change of 60° to

Clothing

Extremes

70° F. is experienced in twenty-four hours at certain times, especially during the fall.

Food

The food question is often a difficulty, but in many of the small mining towns of the State one is surprised to find so many restaurants, all apparently in a flourishing condition, this being due to the fact that most of the unmarried men in the population depend upon them. Food may often be carried along and prepared on the road with a small cooking kit.

"*Don'ts*" *for Pulmonary Invalids in Colorado*

Don't walk about or take any exercise for the first few days, until you see how the climate is going to affect you. Sit quietly outdoors.

Don't eat too much at first; the climate will over-stimulate your appetite, and a bilious attack may follow.

Don't sit outdoors when the sun is going down, as at that time the change in temperature is very sudden and severe.

Don't tire yourself out sight-seeing; the climate over-stimulates you at first, and a reaction will follow.

Don't wear too thin underwear; those made of wool are the best.

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